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THE ATLAS GEOGRAPHIES

A NEW VISUAL ATLAS AND GEOGRAPHY
COMBINED

PART IV. COMMERCIAL ATLAS GEOGRAPHY

*ADAPTED TO MEET THE REQUIREMENTS OF THE ROYAL SOCIETY OF ARTS
LONDON CHAMBER OF COMMERCE, CIVIL SERVICE, AND
OTHER PUBLIC EXAMINATIONS*

SECOND EDITION, REVISED

BY

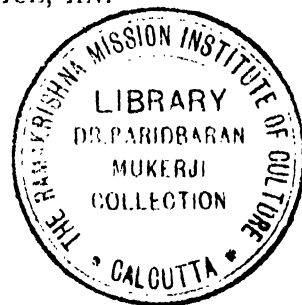
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P R E F A C E.

THE authors have been induced to compile this text-book for the guidance of those students desiring a commercial education, and the work has been specially prepared to meet the requirements of the Civil Service, London Chamber of Commerce, Royal Society of Arts, and other Commercial Examinations.

Part I. deals with the World as a whole, and shows how natural laws govern the distribution of products, manufactures, and population. A survey of the chief commercial products of the world, and the climatic conditions upon which they depend, forms part of this section, which is illustrated by numerous graphs and maps.



In Part II. the geography of each area is based upon the Orographical Map, and the constant comparisons between this and the Route, Climatic, Vegetation, Mineral, Manufactures, and the Distribution of Population, and Political Maps cause the student to retain the visual impressions thus given, and so to realise the interdependence of each part on the whole. The student is strongly recommended to use either the Orographical Atlas published by Messrs W. & A. K. Johnston at 1s., or the Loose Orographical Maps of each area published by the same Firm at 1d. each.

The subject-matter does not consist of isolated facts, but rather a careful leading onward from cause to effect, while the practical Exercises inserted at the end of each section necessitate the use of logical reasoning power.

Great care has been taken to bring both the subject-matter and maps up to date, especially as regards exports and the latest development of routes. The numerous statistics inserted are not intended to be committed to memory, but for purposes of comparison and to give the student some idea of the relative values of the products.

The authors have to tender their thanks to the publishers of the Statesman's Year Book, to the Agents-General for the Colonies in London, to the Railway and Development Companies for statistics and the loan of maps and diagrams; also to Mr W. H. Barker, the Principal of the East Ham Technical College, to Dr Burness, the Principal of the West Ham Central Secondary School, and to other practical teachers for many valuable hints and suggestions.

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COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER I.

THE BASES OF COMMERCIAL GEOGRAPHY.

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Introduction.
Natural Conditions affecting Commerce—
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Introduction.

In commercial geography we take a somewhat restricted view of general geography, and deal with the world in its relations to man as a producer, consumer and trader. As a producer man soon recognises the truth that there is a wonderful diversity in the productions of the various parts of the world; that the diversity is mainly the result of the great varieties of climate to be found; and that each vegetable product has its own particular conditions of climate and soil which must be satisfied for successful growth. As a consumer he realises that his desires must be exceedingly simple if they are to be gratified by the area in which he lives, and as a trader he soon acknowledges the fact that the basis of his profession is the interchange of commodities. A brief survey of the great regions of the world will make these points clear.

In the simplest states of society man has very few needs, and supplies them all from the region in which he lives. The nomadic inhabitants of the *barren tundra* depend almost entirely upon the reindeer for food and drink. Dress and shelter, like food, are mainly the produce of their herds of reindeer. The nomads of the *steppes* have greater wealth, due to their more generous environment, but

they also supply their needs from the land on which they wander. The wool of their sheep is made into tent coverings, beautiful carpets and rugs, while the hides of their cattle are used for the manufacture of leather, for shelter and for clothing. The flesh of their animals serves for food, and the milk is used for drink and the manufacture of butter. The nomads of the *hot deserts* must have few and simple requirements. They have, however, rich lands on either side of their territory, making trade of great importance. As in the cold desert, poverty is the keynote of life.

A more complex state of society is possible in the *forest areas* and their clearings. Forests are found in those temperate and tropical divisions of the world which have a fair or an abundant rainfall.

The occupations of the forest proper utilise its animal life and its timber, giving rise to fur-hunting, lumbering, paper-making and the extraction of resins and saps from the trees. In the clearings agriculture is extensively carried on, and a great variety of products is obtained.

The occupations of the dwellers in *mountainous regions* are determined by the vegetation possible since difficulty of transport renders the importation of raw material impossible. The vegetation zones are dependent upon elevation and vary in different countries. Where a forest zone

occurs wood-carving and the manufacture of toys are important industries. Pasture zones probably result in the manufacture of cheese and condensed milk. Metal industries in mountainous areas are such as demand a large amount of labour and a minimum of raw material.

In the *plain areas* of the world transport is generally easy. Agriculture in such parts is a leading industry where the water supply is adequate, but the presence of mineral wealth rapidly gives rise to centres of dense population and complex industries.

Diversity of product and industry is thus evident in the different areas of the world. With the development of civilisation man no longer depends on the products of his own locality nor upon the results of his own labour to provide him with the necessities and luxuries of life. The world has become a vast trading community through the discovery and perfecting of rapid and cheap lines of transport placing the produce of the whole world practically at his command.

EXERCISES.

1. Contrast the life of the steppe dweller with that of the tundra dweller.
2. Explain why the inhabitants of Norway and Sweden lead a seafaring life.
3. In what parts of the world are nomadic races found? Show how geographical conditions are responsible for the life they lead.

Natural Conditions affecting Commerce.

A. Physical.

1. Situation.

The commercial development of a country must be largely influenced by its position on the earth's surface. The best situation is in temperate latitudes within easy access of the great ocean highways of commerce.

Britain's situation in the centre of the land hemisphere, in close proximity to the well-developed continent of Europe, with her coasts washed by the waters of the open ocean, is ideal.

2. Coasts.

A good sea coast is of great commercial importance to a country. To be good it

should be well broken, having indentations extending far into the land. It should afford protection from heavy waves and be free from dangerous currents. High, unbroken coasts exposed to storms are a great danger to navigation, as are also low sandy coasts rising from shallow seas.

The greater part of the coast of Europe is well broken, affording many harbours in the coastal indentations which extend far into the land. This has resulted in a vast development of trade. The eastern coast of the United States is similarly greatly indented, and affords a striking contrast to the high western shores, which are singularly deficient in harbours. On the Atlantic coast it may be noticed the density of population far exceeds that on the Pacific shores.

The coast of Spain affords little commercial benefit to that country, being in parts subject to very dangerous currents, having a very rugged nature where washed by the Bay of Biscay, and, generally speaking, possessing very bad means of communication inland.

The Indian coast is extremely regular and has only one really good harbour, where the island on which Bombay stands is situated.

Sweden, Germany and Russia are unfortunate in having the greater part of their shores washed by inland seas.

In the south-eastern part of China ranges of mountains run parallel to and near the coast, diminishing the value of the ports by obstructing internal transport.

Other things being equal, a very good measure of the commercial value of a coast is its length per unit area of the country to which it belongs.

Greece has the largest proportion. The *British Isles* have 1 mile of coast to every 20 square miles of area, while *Europe* has 1 mile to every 100 square miles. *Switzerland*, it should be noted, is entirely inland, *Austria*, has a very short coast, and *Belgium* has only 40 miles.

In early times countries with a good water frontage developed quickly, as is shown by the rise of the countries washed by the Mediterranean, e.g., *Carthage*, *Greece*, *Rome*.

3. Mountains.

Omitting for the present the climatic use of mountains, we note first how disadvan-

tageous they can be to commerce by obstructing communication and transport.

The *Alps* for many years shut off *Italy* from the rest of Europe, the *Andes* kept the eastern and western sides of *South America* quite distinct, and the *Himalayas* present a formidable barrier to communication from India to Tibet. Modern engineering tends, however, to minimise the obstruction of mountains to commerce.

Mountains are of great importance commercially in river formation and in supplying water power. They store water in snow, glaciers and lakes, and are an unfailing source of supply of rivers. They are the most important source of water power.

In the early days of our industries, before the advent of coal as a fuel, this was the principal source of energy. The first factories of *Lancashire* and *Yorkshire* were built on the banks of the streams running from the slopes of the *Pennines*, and many of the old water wheels may still be seen. At the present day water power is of more importance than ever now that electricity transmits it to convenient centres for industrial use. A vast amount of machinery in *Switzerland* and the *United States* is run by water power.

Mountains are also the scene of the largest mining industry, and supply most of the minerals of the world.

The windward sides of mountains supply a tremendous amount of timber.

Thus the western slopes of the *Canadian* and north *United States Rockies*, the western side of the *New Zealand Southern Alps*, the *Western Ghats of India*, the south-western corner of *Australia*, and western *Scandinavia* are all heavily forested. The dry mountain slopes supply rich pasture. Thus the *Canterbury Plains* east of the *Southern Alps of New Zealand*, the *Darling Downs of Australia*, and the eastern slopes of the *Rockies* are all magnificent grass lands.

Mountains are also sources of soil which is ultimately deposited on the plains by water action. Thus a large part of *Holland* is the gift of the *Alpine* regions, and the fertile soil of *Egypt* is derived from *Abyssinia*.

4. Rivers.

Rivers are of the utmost importance commercially. They are the natural routes and lines of least resistance from the coast into the interior of a country. To be of the greatest use in this respect they should be free from falls and rapids, free from ice, rapid currents, sandbanks, and bars. Their valleys are more easily developed than other regions, since water transport is cheaper than any other kind, and cheap communication with outer markets is easily maintained.

Rivers are the transporting agents of fertile alluvium from the highlands to the lowlands, enriching the valleys through which they flow.

By this means *Egypt is the gift of the Nile*, the country only being rendered habitable by the animal deposit of rich mud brought down by the river from the *Abyssinian* highlands.

The utilisation of river water in irrigation works is in modern times of great importance.

Mildura in *Victoria* and *Renmark* in *South Australia* are now the centres of important fruit-growing districts, solely because the waters of the *Murray* are now used to render fertile what was formerly semi-desert land. Other instances of the same kind are now quite common.

The mechanical power derived from the running water of rivers and their falls has already been mentioned.

Buffalo is some distance from *Niagara*, yet the mechanical power of *Niagara Falls* drives its mills and lights its streets.

The water of rivers is of considerable use in some manufacturing industries; freedom from lime salts favours the cleansing of flax and silk dyeing; the presence of gypsum in solution aids the brewing industry (see p. 30).

Since rivers take the line of least resistance in traversing a country their valleys lend themselves to fairly easy railway construction.

The riverside route of railways is well illustrated by the *Great Orient Express Route from Cologne to Constantinople* which follows almost through its entire length the valleys of the *Rhine* and *Danube* and their tributaries.

The commercial importance of rivers is not to be measured by length alone, since the short *Thames* has a far greater value than the mighty *Amazon*.

5. *Plains.*

Plains, if fertile, are very favourable to agriculture. The plains of the *monsoon countries* yield a tremendous variety of products which enter into the world's commerce; the plains of *North America* form the chief source of the world's supply of wheat and maize; those of *South America* support a great cattle-rearing industry.

Since the plain areas are favourable to transport they encourage, especially if near the sea, the development of factory industries in which there is a need to import raw materials and export manufactured products. The densest populations are consequently to be found in the plain areas, particularly if they are rich in the mineral wealth needed in the manufacturing industries.

Plains, under certain climatic conditions, are only suited for the production of grass. These develop the pastoral life and do not therefore encourage a dense population.

Areas of this type are the *steppes* of *Europe* and *Asia*, the *prairies* of *North America*, the *pampas* and *llanos* of *South America*, the *downs* of *Australia*, and the *savannas* of *Africa*.

The true shepherd is to be found in the Asiatic steppe, where from time immemorial he has followed his occupation in practically one unaltered manner, uninfluenced by the change and progress in the rest of the world.

EXERCISES.

1. Lowland plains of temperate regions are the most thickly peopled regions of the world. State the geographical conditions causing this.
2. What are the climatic and commercial uses of mountains?
3. River plains and deltas are always thickly peopled. Give geographical conditions causing this.
4. Give an account of the commercial importance of rivers.
5. Name those nations which have produced the greatest colonisers and explorers. Give the geographical reasons causing this.

B. Climatic Conditions.

Climate is the most important factor in determining the distribution of both animal and vegetable life. The two most important climatic elements are *temperature* and *rainfall*.

1. *Temperature.*

Temperature depends mainly upon latitude and elevation. Range of temperature is bound up more with distance from the sea.

(a) *Temperature and Latitude.*

The sun's heating power decreases in passing from the Equator to the poles. This is due principally to the lower altitude attained by the sun at noon.

All places within the tropics have the sun vertically overhead at noon at certain periods of the year. The sun's heating power at such times is a maximum since the rays are more concentrated and suffer the minimum loss. Outside the tropics the sun can never be in the zenith, and the altitude possible decreases as the poles are approached. Thus at Madrid (40° N.) the maximum altitude is $73\frac{1}{2}^{\circ}$, at London ($51\frac{1}{2}^{\circ}$ N.) it is 62° , at Petrograd (60° N.) it is $53\frac{1}{2}^{\circ}$, and at the pole itself $23\frac{1}{2}^{\circ}$.

The total quantity of heat received per unit area thus diminishes as the latitude increases, and therefore the temperature of the air diminishes with increase of latitude. At the Equator the mean annual temperature is about 80° F., and in latitude 50° about 40° F. Calcutta (23° N.) has a mean annual temperature of about 78° F., while Archangel, in latitude 65° N., has a mean annual temperature of about 31.5° F.

It must be further noted that as the latitude increases there is a greater difference in the duration of daylight. At the Equator there is an invariable length of daylight of 12 hours a day; at latitude 30° the possible daylight is 13 hours 56 minutes; at latitude 60° it is 18 hours 30 minutes; at the poles it is 6 months. This unequal length of day and night at all places except the Equator indicates, therefore, that as the poles are approached more and more of the 24 hours during the winter months is given up to cooling, causing a lower mean temperature. At the Equator, there is, therefore, very little difference between summer and winter temperatures, but as the latitude increases the range of temperature is greater. In high latitudes it should, however, be noted that the deficiency in intensity of solar heat is compensated somewhat by the larger duration of sunlight in the growing period.

(b) Temperature and Elevation.

An increase of altitude of 300 feet causes a fall of 1° F. in the temperature of the air. It has also been calculated that an increase of elevation of 420 feet is equivalent in change of temperature to a 100-miles journey at sea level towards the nearer pole. Variations in altitude thus show the same climatic changes as variations in latitude, or in other words, in ascending a mountain the same changes of temperature are observed as would be found in travelling from that station to the polar regions. This explains why European residents in tropical countries seek the hill stations during the hot season, and also explains why high mountain masses always have their summits snow clad.

The effect of altitude on temperature is explained by studying the methods by which the air is heated. It should be clearly noted that direct sun heat has very little effect. The heat rays from the sun strike the earth and are mainly absorbed, thus raising its temperature, and the air near is warmed by contact. The warm earth then radiates its heat outwards, and this is absorbed readily by the water vapour in the atmosphere near the earth. Increase of altitude means removal from the air's source of heat, a smaller density of the air and a smaller quantity of water vapour, which combined account for its lower temperature.

The facts explain why plateaux have a lower mean temperature and a greater range of temperature than lowland areas in the same latitude. The highlands are strongly heated during the day and radiate heat freely at night, the rare air absorbing very little heat. In the same way the summer temperature will be high and the winter temperature very low.

(c) Temperature and the Influence of the Sea.

Water has a much greater capacity for heat than land. It therefore is more slowly heated and cools more slowly than land when under the same solar intensity. The influence of large masses of water is thus to raise the temperature of adjacent land at night and in winter, and to lower the temperature during the day and in summer. The seas and oceans have consequently a

powerful modifying influence on climate, and tend to prevent extremes of temperature. We thus find that the annual range of temperature for any given latitude and altitude increases with the distance from the sea.

Valencia, on the sea coast, has a range of 14° F.; *Breslaw*, 700 miles inland, 37° F.; *Orenburg*, 2300 miles inland, 65° F. The modifying influence of the sea on climate is clearly seen by studying an isotherm map of the *British Isles* and noting how the isotherms bend to the north in winter and to the south in summer on crossing the Irish Sea.

The seas contain currents of warm and cold water, which also have a modifying influence on climate. The *British Isles* and the coast of *Norway* have the full influence of the *Gulf Stream Drift* from the Gulf of Mexico. *Labrador* feels the effect of the cold *Arctic current* which washes its shores. The areas named are approximately in the same latitudes, yet *Labrador* has a mean annual temperature which is below 32° F., while in our own islands the average temperature is 50° F. The warm *Gulf Stream Drift* keeps the *Norwegian coast* free from ice even within the Arctic Circle, while the *Baltic Sea*, 1200 miles farther south, is frozen over in winter.

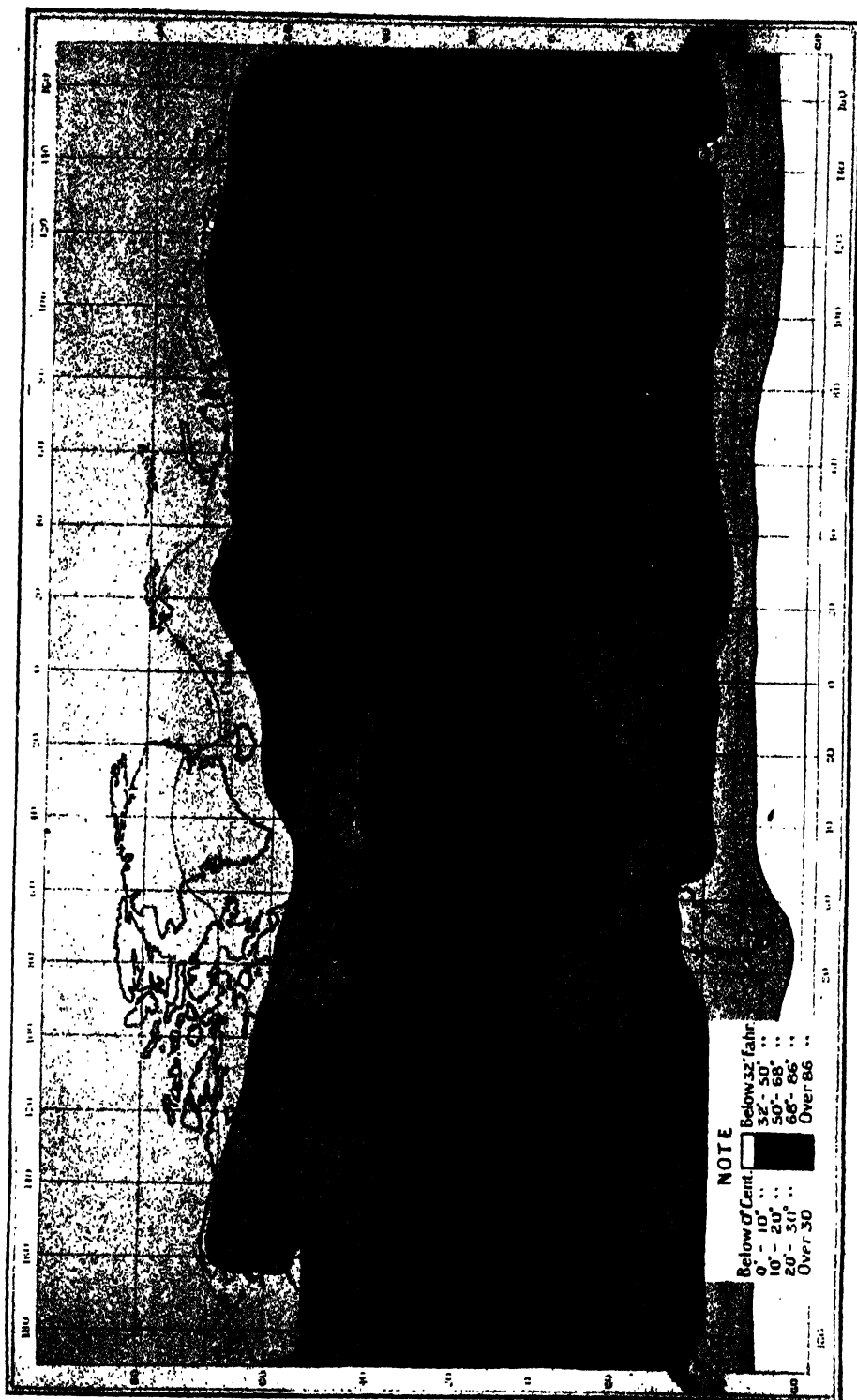
(d) Temperature and Wind Direction.

Winds carry heat from the tropics to cooler regions and the low temperature of the polar areas to warmer latitudes. The heat conserved by the ocean warms the winds passing over it; and since the prevailing winds of the North Atlantic move towards Europe, they raise the temperature of the north-western coastal part of that continent. *Barley* is consequently cultivated in northern *Norway*. The eastern part of *Eurasia*, in the same latitude as *Norway*, is frozen for a considerable part of the year mainly because the prevailing winds are away from the coast and not towards it, as in the case of *Norway*. The same remarkable difference in temperature between east and west is also seen in *North America*. The shores of *British Columbia* are free from ice throughout the year, but the *St. Lawrence* is always ice-bound from November to March. The explanation is exactly the same as in *Eurasia*.

Map 2.



ISOTHERM MAP OF THE WORLD IN JANUARY.



ISOTHERM MAP OF THE WORLD IN JULY.

2. Rainfall.—(a) *Evaporation.*

Evaporation from the surface of the water of the earth is always going on at a rate dependent upon the temperature; the higher the temperature the greater is the rate at which evaporation takes place. The cause of this variable rate is the variation of the capacity of the air for water vapour; the higher the temperature of the air the greater is the quantity of water vapour that it can hold. Air containing its maximum quantity of vapour is said to be saturated. It is therefore clear that if saturated air is warmed it is capable of holding more vapour, while if it is cooled precipitation must take place.

The following graph gives the number of grains of water vapour 1 cubic foot of air can hold at certain temperatures:—

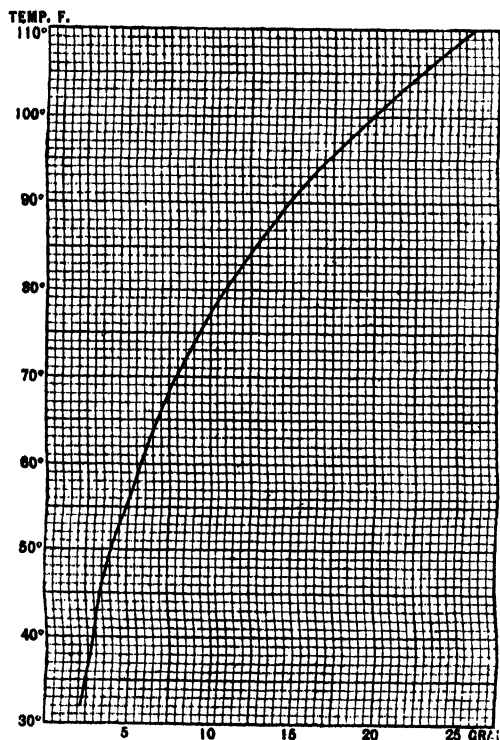


Fig. 1.—Curve to illustrate the capacity of air for water vapour.

The most striking feature of the above graph is the exceedingly rapid rise in the capacity of the air for moisture as the temperature rises, a point to be remembered in comparing tropical and temperate rainfalls.

(b) *Condensation.*

Condensation takes place when saturated air containing dust motes is cooled and may become manifest as *rain, snow, hail, cloud, fog, mist* or *dew*. Our main concern is with rain and its distribution on the earth's surface.

In order that rain may be formed it is clear from what has already been stated that two things are essential: The air must contain water vapour, and it must be cooled to saturation point. Mountain masses play an exceedingly important part in rain formation by acting as cooling agents. A wind blowing on to a mountain mass is forced to ascend, and its temperature must fall 1° F. for every 300 feet increase in altitude. It is, therefore, simply a question as to the humidity of the atmosphere and the altitude of the mountain mass as to when the rain will commence to fall. We consequently find that the majority of the high mountain masses of the world have the windward side wet and the leeward side dry. This dry leeward side is said to be "in the rain shadow."

Mountains.	Rainfall.		Wind.
	Windward.	Leeward.	
Himalayas . . .	Over 60" .	Under 20" .	Monsoon S.W. S.E. Trades.
Great Dividing Range (Queensland)	Over 40" .	20"-30" .	
Andes (Amazon)	Over 60" .	Under 30" .	Trades. Roaring Forties.
Andes (Peru) . .	Over 50" .	Under 20" .	

Cooling may also take place owing to the mixture of a warm and a cold current of air. The air in the higher regions of the atmosphere may be moving in a different direction to that near the earth's surface and have a chilling effect on the air beneath. This may be sufficient to lower the temperature to saturation point and thus cause rain.

A third method of cooling is by direct loss of heat, that is, by the radiation of heat into space.

Generally speaking, therefore, rain is formed when rising air currents are produced either by the relief of the land or any other agency.

A rainfall map of each continent of the world should be studied at this point, wind

direction and relief of the land being carefully observed.

The following points should also be noted :—

<i>Continent.</i>	<i>Rainfall.</i>	<i>Nature of Land.</i>
North Europe and Asia	Under 10"	Tundra.
North Africa . . .	Under 10"	Desert.
Central Europe . . .	20"-25"	Temperate Forest.
South America . . .	Over 60"	Tropical Forest.
South America . . .	30"-40"	Grass Land.
North America . . .	20"-30"	Grass Land.
Central Africa . . .	Over 60"	Tropical Forest.
South Africa . . .	Under 10"	Desert.
Australia . . .	Under 10"	Desert.
Australia . . .	20"-40"	Grass Land.
Australia . . .	Over 40"	Forest.

Irrigation.

Irrigation is the name applied to the artificial supply of water to soils in order to increase their productiveness. It has been carried on since very early times, especially in Egypt and China, but in recent years it has been considerably elaborated and extended. By irrigation works and schemes countries subject to drought have greatly extended their fertile areas, and have rendered agriculture more profitable and less uncertain.

Extensive irrigation works have been established in Australia to make the waters of the Murray serve some useful purpose, and areas, which were formerly scrub land, are now productive fruit-growing districts. The growing Australian wine-making industry is the outcome of the establishment of the irrigation works. By similar means certain areas of India have been rendered less liable to famine than formerly. The greatest irrigation work in India is the Ganges Canal, which is about 450 miles long. Other important areas in which irrigation is successful are the Nile valley, the huertas of Spain, in Italy, and in California. A barrage has been built at Hindie, on the Euphrates, to control the floods of that river, and to ensure a reasonable distribution of its water every year.

Climatic Regions.

Where similar combinations of temperature and rainfall occur we have similar climatic regions. The following are typical :—

1. *High temperature and rain at all seasons, e.g., Central Africa and Amazon basin.*
These are the two large areas of the world in which tropical forests are found.
2. *High temperature and summer rains, e.g., South-East Asia.*
These are the equatorial summer rain areas or the monsoon lands, and are characterised by prolific vegetation.
3. *High temperature and very small rainfall, e.g., Sahara.*
These areas, except in the oases, are practically devoid of vegetation.
4. *Fairly high temperature and small rainfall, e.g., Mongolia and Tibet.*
These are almost desert areas.
5. *Fairly high summer but low winter temperature and medium rainfall at all seasons, e.g., St. Lawrence Basin and Manchuria.*
These areas are on the eastern side of continents.
6. *Fairly high temperature and winter rain, e.g., Mediterranean.*
7. *Cool summers, warm winters, and rain at all seasons, e.g., Western Europe and Western North America.*
8. *Warm summers, cold winters, and summer rain, e.g., Central Europe and Asia.*
These areas are chiefly found in the interior of continents.
9. *Cool summers, very cold winters, and small rainfall, e.g., Northern Europe and Northern Asia.*
These areas form the cold deserts of the world.

Influence of Climate.

The influence of climate is felt in many ways, but chiefly in allowing labour to be more or less continuous. Climatic conditions such as these under which we live in the British Isles are the most favourable, since neither the summer heat nor the winter cold are sufficiently severe to interrupt regular labour.

Severity of winter such as is experienced in Eastern Canada is both an advantage and a disadvantage. Since the rivers are ice-bound direct commerce is hindered, but the accumulation of snow and the slippery nature of the surface give a great impetus to the logging industry. It is in the winter season of the year that the trees are felled, dragged over the slippery snow to the frozen streams there to await the spring, when a good volume of water is sure in the rivers to float them to the mills. Tropical conditions are the most disadvantageous, especially in

the lowlands where malaria and fever often abound. White labour is almost impossible in such parts, and the enervated blacks do not work without compulsion. Malaria is not, however, confined to tropical countries. It is estimated that on an average 15,000 persons die every year of malaria in Italy. The disease has been found to be caused by parasites in the blood, introduced by the bite of a certain species of mosquito which breeds in stagnant water.

Distribution of Vegetation.

A second important influence of climate is in allowing or encouraging different productions. This is best seen from the following table:—

PLANTS OF COMMERCIAL VALUE.

Plant.	Climatic Conditions.	Where Grown.
1. GRAINS—		
Wheat . .	Moisture at time of germination; summer temperature of 60° to 70°	Russia, Hungary, France, etc.; United States, Canada; southern lands of Australia; India.
Barley . .	Similar to wheat; able to withstand colder temperature	All cool and warm temperate lands.
Oats . .	Colder temperature than wheat, and will grow on poorer soil	Cool temperate lands.
Maize and Millet	Warm summer and moisture	Lands having summer rain.
Rice . .	Very warm; plenty of water at roots	Monsoon land, or lands with summer floods.
2. BEVERAGES—		
Tea . .	Warm temperature; well-drained slopes	Monsoon lands.
Coffee . .	Same as tea; requires higher temperature	Tropical & monsoon lands.
Cocoa . .	Moisture and warmth	Tropical lands.
3. FIBRES—		
Flax and Hemp	Warmth, if grown for seed; average temperature, if grown for fibre	Warm lands for seed; cool temperate lands for fibre.
Jute . .	Moist heat	Monsoon lands with heavy rainfall.
Cotton . .	No frost; warm summer; heavy soil holding water at roots	Warm temperate and monsoon lands.

The *vine* requires a hot summer to ripen it, and therefore is the typical plant of Mediterranean lands.

Rubber is the juice obtained from several different plants growing in tropical regions. This juice has in the past

been collected by natives from wild plants growing in unhealthy equatorial plains. Cultivated plants are now being produced on the more elevated lands in tropical regions. In these white labour is possible, so the rubber will be obtainable under better conditions, and with a more certain supply to meet the great demand.

Sago (the pith of the sago palm), *tapioca* (the root of the cassava plant), and *arrowroot*, all require heat and moisture, and are therefore grown in the hot lands.

Sugar.—*Cane* sugar requires a moist heat, and is grown in the summer rain areas. *Beet* sugar, which is obtained from the beet root, is largely supplanting the above. It will grow in the cool temperate lands.

Tobacco is now cultivated in all lands which have a warm enough summer. Originally a native of America, it has been introduced into all the countries of Europe. A warm temperature in the early stages of its growth is necessary, and therefore when grown outside of the tropics the seeds are usually sown in warm sheltered beds and transplanted later.

Hops consist of slender twining plants producing clusters of small green flowers which are used in the brewing of beer. Hops require a very rich soil, and grow better in sheltered valleys rather than on exposed plains.

Pulses, or pod-fruit plants, such as *peas*, *beans*, and *lentils*, will stand a great range of temperature. In the Mediterranean lands and in the warm lands where the people are chiefly vegetarians they form an important article of food.

Potato, a native of America, is now grown in all the temperate lands. The one great objection to it is liability to disease. In Germany it forms a staple article of food, and is grown in quantities in Ireland, France, Austria, and Hungary. Spirit is distilled largely from potatoes, and starch is also obtained.

Cinchona, originally a native of South America, has been introduced into other lands having a warm climate with great success. From the bark is obtained various medicinal products, of which the chief is quinine.

Distribution of Animals.

The fauna, like the flora, is largely determined by climatic conditions.

(a) Hot Lands.

The undergrowth of the *equatorial lowland plains* is too thick to allow of any animal life except birds, monkeys, insects, and reptiles, but the more open wooded spaces of the *summer rain areas* are the home of such carnivora as lion, tiger, and leopard. The streams abound in crocodiles and alligators, and the forests are alive with birds of brilliant plumage and the buzz of insects. The elephant, rhinoceros, and hippopotamus make their home here. The camel is the chief animal of the desert.

(b) Temperate Lands.

Temperate lands produce the domestic pasture animals (ox, sheep, and goat) and the horse and donkey. Carnivorous animals are fewer, being only represented by the bear, wolf, and fox. Grouse, pheasants, fowls, geese, and turkeys are common. Reptiles and insects are few and small.

(c) Arctic Lands.

The chief animals native here are fur-bearing, like the polar bear, Arctic fox, sable, and musk ox. The reindeer is the chief domestic animal. Whales, seals, and walrus are found in the Arctic seas.

Animals can adapt themselves to varying conditions within certain limits. The vegetable world forms the basis of animal life.

Influence on Manufactures.

A third important influence of climate is the manner in which it favours certain manufactures. This is particularly conspicuous in the *cotton manufacture*. This industry can only be successfully carried on where a humid climate is found, since the threads tend to break in a dry atmosphere. In some inland parts of Europe and America, where the atmosphere is comparatively dry, artificial damping has been resorted to, but this has not been a great success.

Flour milling is best carried on where the atmosphere is dry. Thus *Budapest* in Hungary, *St. Paul* and *Minneapolis* in the United States, have become noted for the manufacture of flour.

Another influence of climate is the manner in which it affects transport. Severe

winters may suspend the ordinary modes of locomotion. Thus heavy snowfalls may render railway routes and roads temporarily impassable, and low temperatures may block rivers with ice. The rivers and other water routes of Eastern Europe and Eastern North America are in this way practically useless for a large part of the winter months.

EXERCISES.

1. Show clearly how temperature depends upon the altitude of the sun.
2. Explain why variations in altitude show the same climatic changes as variations in latitude.
3. Why have plateaux a lower mean temperature and a greater range of temperature than lowland areas in the same latitude?
4. Account for the great annual range of temperature at Verkhoyansk.
5. Why do isotherms over the sea of the British Isles bend southward in summer and northward in winter?
6. Write a short account of the influence of climate on commerce.
7. "Climate decides the distribution of vegetable life." Discuss this statement.

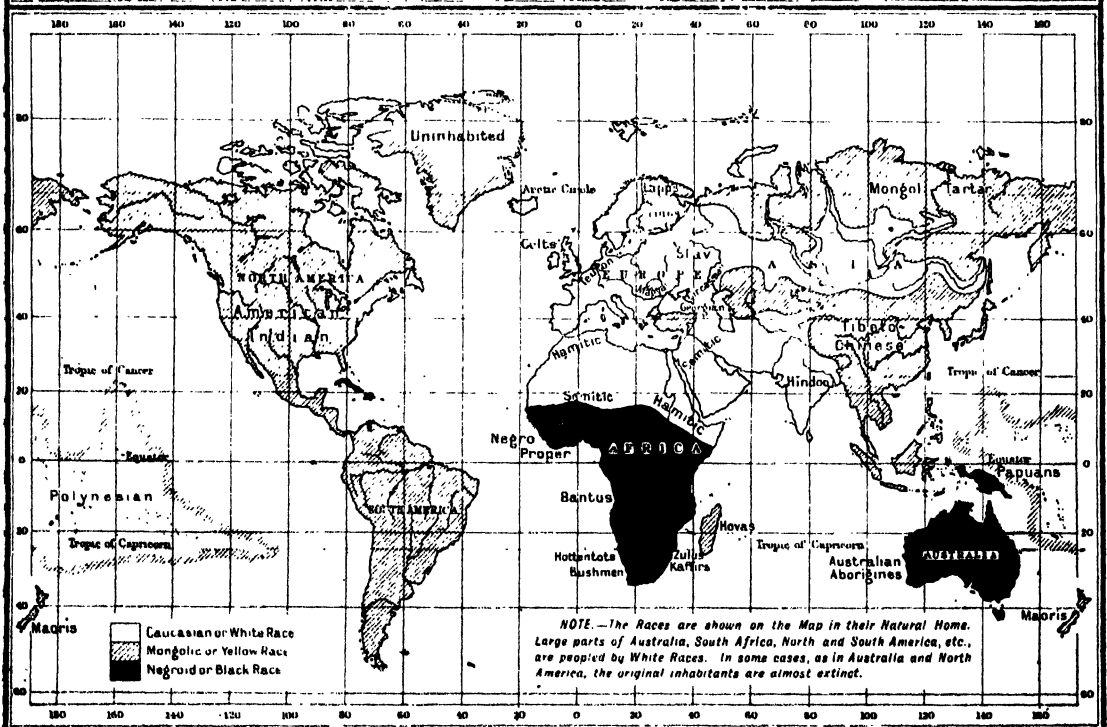
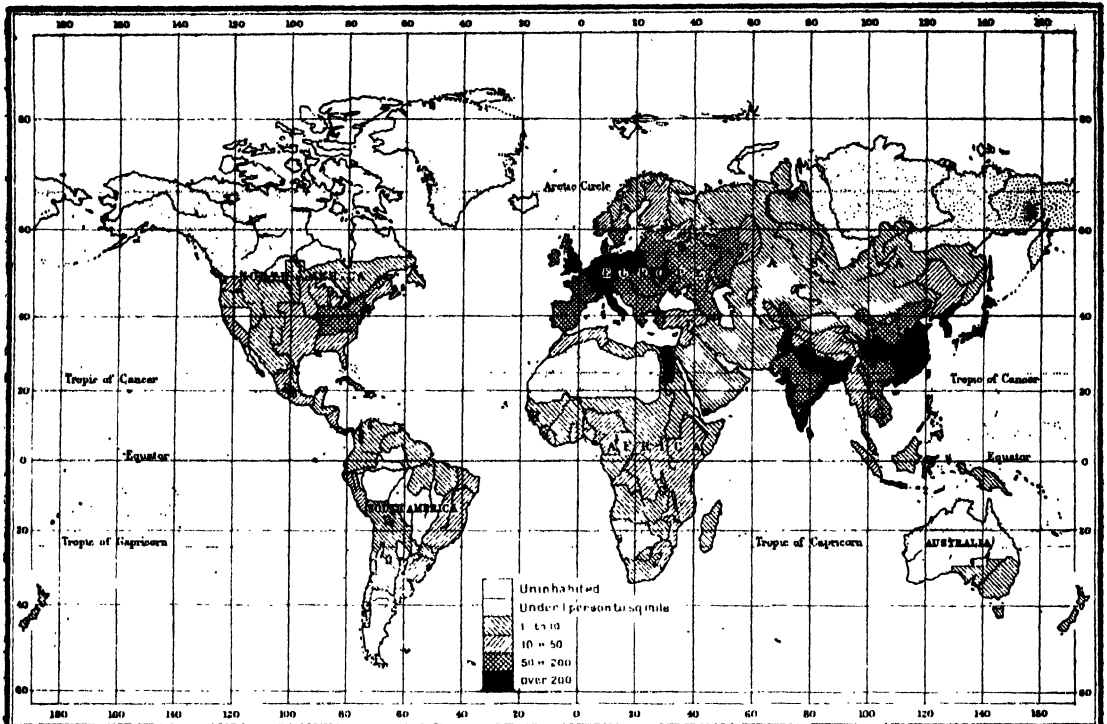
C. Distribution of Mineral Wealth.

The possession of mineral wealth affects the industrial power of countries to a considerable extent. Unlike agricultural wealth, however, it must eventually become entirely exhausted. *Coal* and *iron* are the necessary instruments of manufacture. *Coal* at the present time is the chief fuel, though there are signs that it will ultimately be displaced by *oil*. Since it is, however, the chief fuel, it is important to note that the great manufacturing nations of the world are those which have rich deposits of that substance. *Great Britain*, the *United States*, *Germany* and *France* are consequently foremost as manufacturing countries. The value of coal is considerably increased if in its neighbourhood *iron* and *limestone* are also found, for then the smelting industry and the manufacture of machinery can be carried on with success.

Minerals provide also the raw material of certain manufactures. Thus *clays* form the basis of the *pottery industry*, *sand* of the *glass manufacture*, *salt* of the *chemical trade*, and *metals* of the *hardware industry*.

The importance of *gold* is worth special mention. Its intrinsic value is so great that

DISTRIBUTION OF POPULATION.



RACES OF MANKIND.

it has played an important part in the development of many countries. Due to its discovery, cities with every modern convenience have sprung up in the hot desert of *Australia*, as at *Coolgardie*, *Kalgoorlie*, and *Southern Cross*, and in the cold desert of *Alaska* at *Klondyke* and *Dawson City*. Gold more than any other commodity has stimulated exploration, attracted population, and developed new countries, which ultimately come to depend on other resources.

The possession of mineral wealth in a country does not always, however, cause the people to develop mining or manufacturing industries. Generally speaking, it will not be the case outside the cool temperate region. Thus Spain is rich in coal, iron, copper, lead, and quicksilver, yet most of the mining is carried on with foreign capital and labour. China has wonderful supplies of coal, yet it is not mined. The Balkan Peninsula is a third instance of the same kind. The explanation lies, in each case, with either the character of the people or their mode of government.

EXERCISES.

1. State the alternatives in the fate of a gold-mining region when the mines become exhausted or cease to pay.
2. In what conditions might a coal mine be immediately of greater value than a gold mine?
3. Write a short essay on the value of coal to the manufacturing industry.

D. Other Conditions affecting Commerce.

1. *The Influence of Races.*

The three great races, *black*, *yellow*, and *white*, share the world's commerce very unequally. The *black type* are least civilised, and take the smallest part in trade. They show in the most pronounced way the enervating and degrading effect of tropical heat and luxuriance.

The *yellow type* are highly civilised, and take an important part in trade.

The *white type* are the most highly civilised and progressive, and show very clearly that the temperate regions of the world, where labour is necessary and generally recompensed, tend to produce the highest development. They control most of the commerce of the world.

2. *The Influence of Government.*

The state of the commerce of a country must be largely affected by the nature of its government. Bad government always injures industry or trade. A number of the South American Republics are unstable, and their trade has consequently violent fluctuations.

The output of the fertile valley of the Upper Nile was very restricted during the tyrannical Mahdist rule.

Good government must promote commerce. Commodities can be produced to the utmost extent possible when order is maintained and justice administered. A good government is stable and free, giving personal freedom and security of property. Special departments have care of trade and industrial interests, as the Board of Trade and the Board of Agriculture in our own country, and the Department of Trade and Industry in France. A good government also increases and improves production by collecting and distributing information of value to farmers and manufacturers. Government funds are also used to improve the waterways of a country to promote trade, and to render shipping as safe as possible by providing harbours and lighthouses. Geological surveys are undertaken, which are beneficial to the mining industry. A good consular service is established to safeguard the rights of citizens in foreign countries. Commercial treaties between nations are often agreed upon to promote trade.

Tariffs or taxes upon imports, and sometimes exports, are maintained for revenue, and exert a great influence on the amount of certain commodities produced for commerce. Frequent changes of tariff rates are bad, since they unsettle business.

To secure new markets and new sources of raw material, colonial possessions are often acquired. Usually the Mother Country has a larger part of the trade of her colonies than any other nation.

3. *Influence of Religion.*

Religious precepts often exercise a direct effect upon trade. The Catholic countries consume a very large amount of fresh and salted fish. Alcoholic liquors are forbidden in Mohammedan countries. The spread of Islam in Africa has made a great demand for white cotton cloth. Buddhism interdicts the

rearing of cattle, and Buddhist opposition has restricted trade with Tibet. The state religion of China for centuries stood in the way of progress.

4. *Influence of Density of Population.*

The largest commerce can only be developed in densely peopled areas, since sparsely peopled regions need very little and have very little to sell. An area may be rich in natural resources, but it must be well peopled for these resources to be developed, since scarcity of population means lack of capital and labour. Our colonies spend large sums of money in advertising their land, recognising that the fullest development is only possible with a greatly increased population. The most densely peopled parts of the world are usually in the neighbourhood of coal and iron mines, which form the basis of the manufacturing industry, and along some sea-coasts where the cheapest commercial routes are at hand, but the monsoon lands, which are capable of producing a great variety of food products, also support dense populations.

In most countries the industrial regions are most, and the agricultural lands least, thickly populated; but this rule does not apply in the monsoon lands, where people are so poor that their commerce is not in keeping with their great numbers.

5. *Influence of Custom and Historical Usage.*

The effect of custom on commerce is very important. Once an industry is established in a place it tends to remain there. The necessary labour is there, lines of transport have been perfected, the industry is known; all these are advantageous to the industry against competition. The industry therefore continues to exist, although perhaps the conditions are not so favourable as could be desired, by what is termed "geographical inertia."

The bond between Britain and her colonies led to an early establishment of commercial relations. Trade grew because they were in constant communication with us. The trade routes of the world are now more numerous, other countries are linked up with us by regular means of communication, but the colonies still take a large share of Britain's trade.

Changes are usually slow, and industries may continue to exist even after the condi-

tions which favoured their establishment have passed away (e.g., *Kendal, Appleby, and Norwich*).

6. *Influence of Languages.*

The commercial language throughout the British Empire is English. In South America Spanish and Portuguese predominate owing to the early conquests of the Spaniards and Portuguese in the New World. North of the Equator, in Africa, Arabic is the chief language of commerce, whilst Chinese and Malay are largely employed in the Far East.

In South Africa Taal, a Dutch dialect, is widely spoken, while in East Africa Swahili is the recognised language between Europeans and Natives.

EXERCISES.

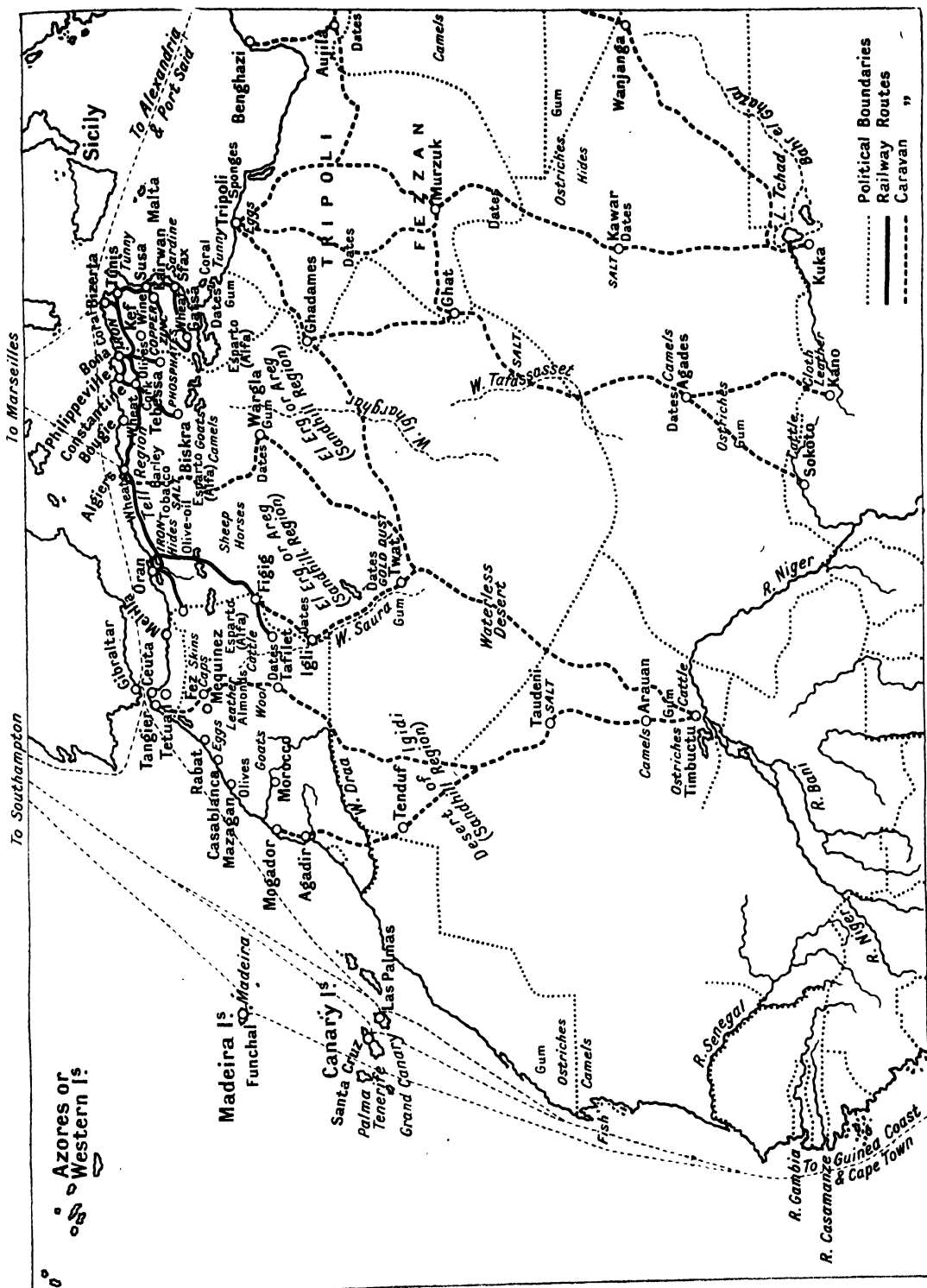
1. Show how the nature of the government of a country can influence its commerce.
2. Why are the chief British colonies endeavouring to attract people to their lands?

Transport by Land.

Land routes embrace every kind of road from the caravan track across the desert to the most elaborate system of roads or railways.

Human Transport.—The simplest form of carriage is by *native porters* in equatorial regions, where the luxuriant vegetation, dense undergrowth, and in Africa the loss of draught animals due to the tse-tse fly, make travelling difficult. In equatorial Africa native porters carry loads of 60 to 80 lbs. on their backs. Before the railroad was built it cost £40 a ton to move goods around the 235 miles of cataracts in the Lower Congo. In China, also, much produce is still carried by porters, where, owing to the dense population, labour is cheap.

Animal Transport.—In mountainous countries, where the only roads are narrow bridle-paths, loads are carried by *horses, mules, or donkeys*. *Asses* and *mules* are employed mainly in the warmer parts of the temperate zone. *Mules* are the typical beasts of burden in mountainous countries. *Llamas* are used in the Andes, and *yaks* in the Himalayas. In deserts goods are carried by *camels*. These animals are particularly fitted by nature for use in arid sandy districts. They can travel for days without food or drink. *Reindeer* and *dogs* draw the sledges over the



ROUTES ACROSS THE SAHARA.

Scale, 375 miles to the inch.

snow of the Tundra. The *horse* is the chief beast of burden in the steppes. In marshy equatorial forests the *elephant* is indispensable. It can carry very heavy loads, but requires a large amount of food in proportion to the work done.

Road Transport.—When *roads* can be constructed carts can be used. By means of *wheeled vehicles* animals can draw a much greater weight than they can carry. Good roads exist in Europe and North America, and modern engineers are now constructing them elsewhere. Traffic along roads is very slow and expensive, so that the use of carts is chiefly purely local. The recent use of *motor vehicles* on roads is very important, since it is rapid and enables heavier loads than formerly to be moved.

Railway Transport.—*Railways* are now overcoming all physical barriers, streams and gorges are bridged, and mountains are pierced by tunnels or crossed by railways. They have been the means of opening up many regions to commerce. The east and west coasts of North America are linked up by several lines of railway. The European coast of the Atlantic Ocean is joined to the Asiatic coast of the Pacific by the *Trans-Siberian line*; South America is crossed by railway; while Cairo will in the near future be connected with Cape Town by a railway through Africa. Railways can deal with considerable quantities of goods, and transmit them more quickly than any other means. Railway traffic is the most important means of land transport.

Railways of the United Kingdom.

<i>England.</i>	Miles.
Great Western	3006
London and North-Western	1976
North-Eastern	1723
Midland	1739
Great Eastern	1217
London and South-Western	981
Great Northern	1262
London, Brighton, and South Coast	487
Lancashire and Yorkshire	596
South-Eastern and Chatham	647
Great Central	808

Scotland.

North British	1164
Caledonian	1103
Glasgow and South-Western	570
Highland	493
Great North of Scotland	331

Ireland.

	Miles.
Great Southern and Western	1121
Midland Great Western	538
Great Northern	688
Dublin and South-Eastern	160

Trans-Continental Railways.

Trans-Siberian Railway.

The Trans-Siberian Railway has opened up a new route which facilitates, shortens, and renders more convenient the journey from Western Europe to the Far East. It runs from Moscow to Vladivostok, passing through Samara, Cheliavinsk, Omsk, Taiga, Krashnoyarsk, Irkutsk, and Harbin. A branch runs from Harbin *via* Mukden to Port Arthur. Mukden is linked up with Peking by rail. The length from Moscow to Port Arthur is 5500 miles. The line was built during the years 1891-1901.

Canadian Pacific Railway.

The Canadian Pacific runs from Montreal to Vancouver through Ottawa, Sudbury, Port Arthur, Fort William, Winnipeg, Brandon, Regina, Moose Jaw, Medicine Hat, Calgary, Banff, Kamloops, and New Westminster. The length of the main line is 2905 miles. By the use of this line the journey from Liverpool to China and Japan is shortened by 1200 miles. The line was built during the years 1882-1886.

Particulars with regard to the other great railways of the world appear later in the book.

EXERCISES.

1. Give an account of the chief modes of land transport employed in different parts of the world.
2. Describe in detail one of the great trans-continental railways.
3. Write an account of the overland route to the East.
4. Which is the shortest route from London to China? What is its length, and how long would the journey take?
5. In which parts of the world are—
 - (1) caravan routes still important?
 - (2) transport by animals of great importance?
6. Explain why carriage by human porters is so important in China and East Africa.

7. State the parts of the world in which the yak, dog, camel, ox, reindeer, horse, and elephant are respectively used for transport purposes.

Transport by Water.

Water transportation is cheaper than land transportation. The reason for this is that the same power can move a greater weight through the water than across the land, and on the water there are no routes to make or repair. The cheapest rates are on the long ocean routes. On the great lakes of North America the rates are slightly higher, since

means Australia, New Zealand, and Argentina send large cargoes of meat to our country; Cape Colony and Australia send grapes; Spain sends onions and tomatoes.

In ocean navigation "great circle" sailing is followed wherever possible. This shortens journeys, the arc of a great circle being the shortest journey between two points. In fig. 2 the distance A X B on a great circle is less than A Y B along a parallel of latitude. Advantage is also taken of winds and currents where they can be of help.

River Transport.—Navigable rivers provide a cheap means of transport. Many rivers are rendered more or less unsuitable as routes by shallowness, presence of silt at their mouths, sand-bars or banks, falls or cataracts, or by being frozen for a part of the year. Falls or cataracts may be overcome by canal construction. This can be clearly seen in the *St. Lawrence*, where navigation is rendered possible by this means right to the head of *Lake Superior*.

A very serious drawback to a river occurs if it flows into an inland or Arctic sea. Thus the *Volga*, a long, slow-flowing river, enters the Caspian Sea, and the long *Mackenzie* enters the Arctic Ocean. Such rivers must have a very restricted use. Where rivers can be connected by canals, water carriage becomes very important. The following table shows how the chief rivers of England are thus linked up.

Canal.	Rivers connected.
Leeds and Liverpool . . .	Mersey and Yorkshire Ouse.
Grand Junction (London and Birmingham)	
Shropshire Union (Birmingham and Severn)	Thames and Severn.
Trent and Mersey . . .	Trent and Mersey.
Kennet and Bath Avon . . .	Thames and Avon.
Upper Thames and Gloucester	Thames and Severn.
Cherwell and Warwick Avon	Thames and Severn.

Canal Transport.—Every country, as it becomes more thickly populated, finds it necessary to cut canals for the transportation of heavy goods which are not of a perishable nature.

The development of shipping has caused great ship canals to be cut, in order to shorten routes and save time. They are maintained by tolls on the shipping that utilises them. They often affect the industries of men not directly concerned with

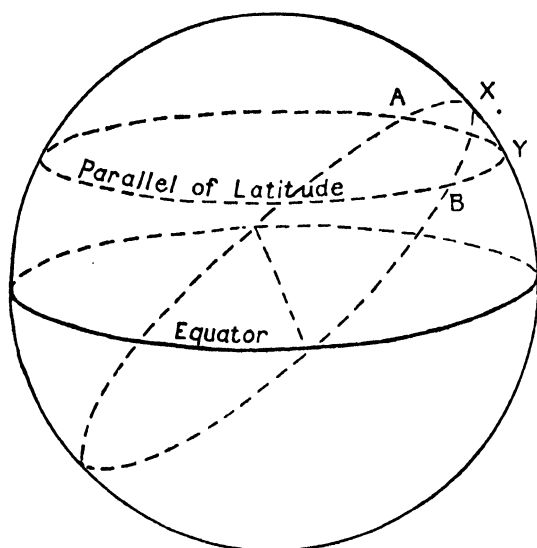


Fig. 2. —Great Circle Sailing.

smaller vessels are used than on the ocean, and the connecting rivers and canals present difficulties.

Ocean Transport.—The rapid growth of steamships during the last century has increased water transport. Sailing vessels, although cheaper to build and maintain, are so slow that they are rapidly being replaced by steam vessels. The increased speed of modern vessels brings goods from America in less than a week, and those from India in a little over a fortnight. Cheap rates make it possible to send bulky and heavy goods of low value considerable distances. South Africa imports lumber from Oregon; and Holland imports building stone. Refrigeration makes it possible to transport perishable commodities considerable distances without any loss in value. By this

trade. Thus the cutting of the Suez Canal made India a large wheat-growing and exporting country. The special function of the Manchester Ship Canal is that it makes an inland town into a seaport. In this way trans-shipment at Liverpool of cotton and other commodities is rendered unnecessary. This means a saving of time and expense. The canal cost £15,000,000.

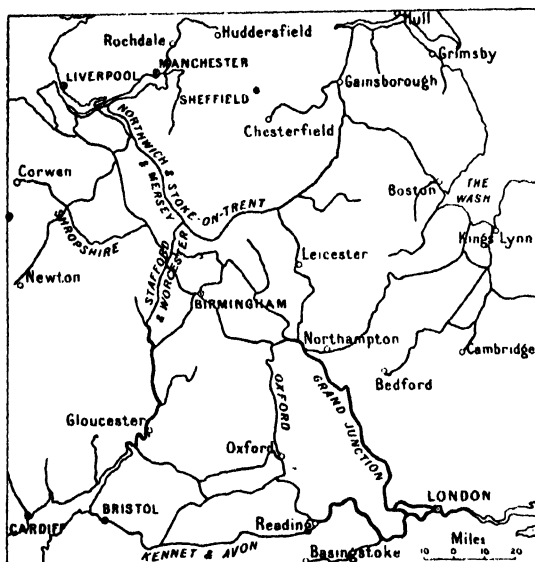


Fig. 3.—Canal Systems of the Midlands.

The chief ship canals of the world are:—

	Miles.	Journey saved.
Suez Canal	87	4800 miles.
Panama Canal	40	
Kaiser Wilhelm Canal	61	2 days.
Corinth Canal	3·7	
North Sea Canal	16	
Manchester Ship Canal	35½	

Suez Canal.—Opened 17th November 1869. Length, 87 miles.

Number of vessels passing through—

1869	10
1890	3389
1909	4239

In 1909 about 60 per cent. of the vessels were British.

The construction of the *Panama Canal* will have the following effects on the ocean routes:—

1. The distance from New York to the American Pacific ports north of Panama will be reduced by 8415 miles.

2. The distance from Liverpool to the same ports will be reduced by 6046 miles.

3. New York will be 2400 miles nearer Sydney than Liverpool will be.

Transport of Fluids.

Fluid commodities are now transported considerable distances through pipes. In North America crude petroleum is pumped through pipes for hundreds of miles from the oil-fields to the refineries; and in Russia the same mineral oil is pumped through pipes from Baku on the Caspian to Batum on the Black Sea. Water is similarly conveyed long distances through pipes; Birmingham now obtains its water from Wales.

Telegraphs and Telephones.

In connection with transport the invention and wide use of the electric telegraph and telephone should be noticed. The telegraph has revolutionised business. The first cable to India was opened in 1865; the Atlantic cable began in 1866. From that date the whole world has been in telegraphic communication. The merchant can now regulate his business, in whatever part of the world it may be, without leaving his office. The invention of the telephone is still further modifying business methods. Long-distance telephone messages are now quite common. By these means electricity has become a great medium of communication which has culminated in the modern widespread use of wireless telegraphy.

The postal service is a cheaper, but a slower means of communication. Its value to commerce is, without doubt, very great indeed.

Some of the Chief Shipping Companies:—

Allan Line—

London, Liverpool, Glasgow, Londonderry, Havre and Plymouth to American ports.

American Line—

Southampton and New York.

Anchor Line—

The Clyde to New York.

Glasgow and Liverpool to Bombay and Calcutta.

Atlantic Transport Co.—

London to Baltimore, Philadelphia, and New York.

Austrian-Lloyd Steam Navigation Co.—

Trieste and the East.

Bibby Line—
Liverpool and the East.

Blue Funnel Line (Alfred Holt & Co.)—
Liverpool and Glasgow to South Africa and Australia.

Booth Line—
Liverpool and South America.

British and African Steam Navigation Co.—
Liverpool, London, Rotterdam, and Hamburg to West Coast of Africa.

British India Steam Navigation Co.—
London and the East.

Canadian Pacific Railway Co.—
Vancouver to Japan and China.
Liverpool and Canadian ports.

Clan Line—
Glasgow and the East.
Glasgow and African ports.

Compagnie Générale Transatlantique—
Havre, Bordeaux, Marseilles to African and American ports.

Cunard Co.—
Liverpool to New York and Boston.
London, Southampton, and Canada.

Dominion Line—
Liverpool and Canadian ports.

Ellerman Lines—
Glasgow and Liverpool to the East.
Glasgow and Liverpool to African ports.

Hamburg American Line—
Hamburg and Southampton to New York.
Montreal, Halifax, Boston, New Orleans, West Indies, and South American ports.

Leyland Line—
Liverpool and West Indies.
London and New Orleans.
Liverpool and Boston.

Messageries Maritimes—
Marseilles and various ports.

Norddeutscher Lloyd—
Bremen and Southampton to New York and Australia.

New Zealand Shipping Co.—
London, Plymouth, and Australasia.

Orient Line—
London to Australasia *via* the East.

Pacific Steam Navigation Co.—
Liverpool and South America.

Peninsular and Oriental—
London to the East and Australia.

Red Star Line—
Antwerp, Dover, and New York, Boston and Philadelphia.

Royal Mail Steam Packet Co.—
London to South America.
London to the East.

Union Castle Line—
London and Southampton to South Africa.

White Star Line—
Southampton to New York.
Liverpool to New York and Canadian ports.

Wilson Line—
London and Hull to Baltic ports.
London and Hull to Black Sea.
Hull to Bombay.

Postal and Telegraphic Notes :—

1840. First penny post.
1874. International Postal Union founded.
1851. Submarine cable—Dover to Calais.
1866. Submarine cable—Valentia to St. John's.
1902. First Pacific cable.

Radiotelegrams—3s. a word to places abroad;
10½d. a word to ships.

Cable Rates :—

To Aden, 2s. a word.
Argentina, 2s. 6d. to 2s. 9d. a word.
Belgium, 2d. a word.
Bermuda, 2s. 6d. a word.
Borneo (British) 3s. 7d. to 3s. 10d. a word.
Burmah, 1s. 10d. to 2s. a word.
Cape Colony, 2s. 6d. a word.
Egypt, 1s. to 1s. 4d. a word.
Japan, 4s. 7d. to 4s. 10d. a word.
New York, 1s. a word.
New Zealand, 2s. 9d. to 3s. a word.
Queensland, 2s. 9d. to 3s. a word.

Trade Routes.

1. British Isles to North America.

Liverpool to New York, 3036 (7 days).
Southampton to New York, 3091.
Liverpool to Quebec, 2625.
Liverpool to St. John's, 1926.
Glasgow to Quebec, 2558.

British Imports.—Wheat, oats, timber, fish, butter, cheese, furs, hides, asbestos, copper, and nickel from Canada. Wheat, maize, timber, tobacco, fruits, cotton, petroleum, metals, and animal products from United States.

2. British Isles to West Indies.

Southampton to Kingston, 4059 (17 days).
Southampton to Barbados, 3622.
Bristol to Jamaica, 4003.

British Imports.—Tobacco, fruits, coffee, coconuts, sponges, spices, sugar, and forest products.

3. British Isles to Central and South America.

Liverpool to Aspinwall, 4545 (19 days).
Southampton to Paramaribo, 4100.
Liverpool to Para, 4043.
Southampton to Pernambuco, 3962.
Southampton to Monte Video, 6806.

British Imports.—Coffee, coconuts, rubber, sugar, timber, meat, wool, wheat, and forest products.

7. *British Isles to Europe.*(a) *Cross-Channel Routes.*

Dover to Calais, 22.
 Folkestone to Boulogne, 26.
 Newhaven to Dieppe, 67.
 Southampton to Havre, 105.
 Weymouth to Jersey, 98.
 Dover to Ostend, 65.

(b) *North Sea Routes.*

Harwich..... { Antwerp, 135.
 { Hook of Holland, 106.
 Hull..... { Amsterdam, 208.
 { Hamburg, 382.
 { Christiania, 552.
 Newcastle ... { Hamburg, 422.
 { Copenhagen, 586.
 { Bergen, 420.
 Leith. { Copenhagen, 610.
 { Christiansand, 394.

(c) *To Mediterranean.*

London { Gibraltar, 1313 { Malta, 991. Constantinople, 897
 { Genoa, 854 { Naples, 926
 { Corunna, 565 { Marseilles, 695
 { Barcelona, 518
 { Rostof, 620
 { Odessa, 344

British Imports from Mediterranean. — Seville oranges; Malaga and Messina, lemons; Valencia, almonds; Barcelona, nuts; Certe, dates and wines Oporto and Tarragona, port; Bordeaux, claret Xeres, sherry; Patras, currants; Salonica, tobacco Odessa, wheat; Batum, petroleum; Jaffa, oranges Suluia, maize; Marseilles, olive oil; Naples, sulphur Carrara, marble; Fiume, wheat; Salonica, carpets Trebizond, silk.

Quickest Journey round the World.

	Distance.	Time.			
		Miles.	d.	h.	m.
1. London to Dover by S.E. & C.R.	77	0	1	45	
2. Dover to Calais by boat	22	0	1	30	
3. Calais to Brindisi—Overland Route	1,360	1	16	15	
4. Brindisi to Bombay by boat	4,632	11	0	0	
5. Bombay to Calcutta by train	1,221	1	6	30	
6. Calcutta to Hong-Kong by boat	3,570	10	0	0	
7. Hong-Kong to Yokohama by boat	1,840	6	0	0	
8. Yokohama to Vancouver by boat	4,980	12	0	0	
9. Vancouver to Halifax by C.P.R.	3,636	5	12	0	
10. Halifax to Liverpool by boat	3,000	7	0	0	
11. Liverpool to London by L.N.W.R.	192	0	3	40	
TOTAL	24,550	54	18	10	

By allowing for delays at changes the journey should take about 60 days.

EXERCISES.

- Describe the usual route of a steamer from London to Sydney. State an alternative route.
- What will be the chief commercial results of the opening of the Panama Canal?

- Why is water transport generally cheaper than land transport?
- Write an account of the importance of canals as water routes.
- What are the conditions which determine the growth of large modern seaports?
- Name the chief ports of call in a journey from London to Yokohama. What would be the distance traversed, and how long would the journey take?

Sites and Growth of Towns.

The position of all towns has been determined by some natural geographical condition or source of natural wealth. Generally speaking, any situation offering special advantages as a meeting-place of business men, or for the manufacture or disposal of commodities, will probably be occupied by a town or city.

Sites of Early Settlements.

The mode of life among savages and the changing encampments of nomadic tribes offer a marked contrast to the settled life of civilised peoples. The last named gather together at places that offer special facilities for trade. In early times men chose a site suitable for defence, building their villages in steep and inaccessible places, or near a fortress or castle situated on high ground, in order to protect themselves from attack. The vicinity of castles offered a further benefit; a refuge was afforded in time of danger. Water supply was also a most important consideration, and a large number of the early towns sprang up where water-bearing strata of rocks came to the surface. The site of *Paris* is interesting. The earliest settlement was for safety on the Ile de la Cité. Other towns have grown up round a religious centre, like *Durham* or *St. Andrews*.

Sites on Navigable Rivers.

Under more settled conditions the lower land became more populated on account of the greater ease of communication. The towns then sprang up near navigable water, the waterway becoming an easy route to other parts. Most of the densely peopled regions of early times were on the lowlands near great rivers, e.g., *Lower Nile valley* and

Gap Towns. --

The place where routes meet or toward which they converge (a node) is a favourable situation for a town. Where gaps occur in hills and mountains, routes converge towards them from either side, in order to effect the easiest crossing. The gaps consequently become busy centres of traffic, and in many cases become market towns. *Maidstone, Guildford, Rochester, Canterbury, and Lincoln* are examples of towns that have had their origin in this way.

Towns at Confluence of Rivers.

Where two or more rivers meet, a busy centre is similarly obtained. This is often the case even when the rivers are not navigable, since roads and railways follow river valleys as the "line of least resistance," and the node formed by the rivers becomes also an artificial nodal point by the intersection of the roads or railway routes.

Oxford, St. Louis, Coblenz, Vienna, and Lyons are examples of this mode of town formation. *Vienna* is at the convergence of routes from the valleys of Silesia, from the highlands of Bohemia, and from the wheat lands of Hungary. It thus became a natural trading point, and a city developed there.

Towns at Limit of Navigation.

Towns spring up at the mouths of navigable rivers at the limit of navigation, where trans-shipment is necessary, and a change has to be made from water to land transport. Under suitable conditions very large towns may be formed in this way. As commerce is developed, so a large population will be required to deal with it and subsidiary industries; the inland routes will be perfected and a continuous growth will be maintained.

Some of the largest towns in the world have had their origin in this way. *London, Liverpool, Glasgow, Hamburg, Duluth, and Albany* are examples. It should be noted that, in the days of the formation of such towns, vessels of shallow draught were employed in commerce. Consequently, with increased size of ships in modern times, and the silting up of rivers, the rivers have to be made deeper by dredging, or the towns would lose importance. The Clyde may be quoted as one river where vast

sums of money have been spent to create the present important port of Glasgow. Since the cost of water transport is less than land transport, many large seaports are placed as far inland as possible; *Philadelphia* is over 100 miles from the sea.

Bridge Ports.

When vessels were much smaller than now used, ocean navigation reached farther up the river estuaries, and the limit of ocean navigation was also the position of the first bridge on the river. Land routes would converge on the bridge as the first convenient place for crossing, helping to make it a busy trade centre, e.g., *London, Glasgow, and Gloucester*. Similarly at places where a river could be conveniently forded a suitable site for town formation was formed, e.g., *Oxford*.

Towns at Bends in Rivers.

Bends of rivers often form nodal points. Roads and railways follow rivers where possible, hence at a bend in a river some routes which have previously followed must leave it while others join it. The convergence of these routes will cause a trade centre. *Kazan, on the Volga and Orleans on the Loire* are good examples. Similarly considerable change in the direction of a river may lead to the formation of a town, as at *Magdeburg, on the Elbe*.

Towns at Waterfalls.

Waterfalls and rapids have given rise to many towns. The water power may lead to the development of industries. *St. Paul and Minneapolis, on the Mississippi*, have developed the flour-milling industry owing to the water-power derived from *St. Anthony's Falls*. A waterfall must mean the limit of navigation of that section of the river, and a transference to road or rail traffic of any cargo carried by water.

In the Eastern United States the line of division between the Atlantic plain and the Appalachian highlands is marked by rapids where streams cross it. It is consequently called the *fall line*. Since the falls determine where boats must stop, and also where there is water-power, a line of villages sprang up on the fall line. The line stretches from *New York to Alabama*, and on

it are the towns *Trenton, Washington, Richmond, Petersburg, Raleigh, Columbia, Augusta, Macon, and Montgomery.*

Towns where Routes leave Plains to cross Mountains.

The products of mountain areas differ from those of the plains, and consequently an exchange of commodities is possible at the junction of mountain and plain. The most convenient site for towns in such a case would be on the natural routes leading from the lowland over the highland. *Turin* is an example of a town which has arisen under these conditions.

Towns of Railway Formation.

Numerous towns may be said to be of railway formation. The places where railways intersect are usually fixed by the physical features; if the country is high the routes either go round by the coast or along the river valleys and over the mountain passes. Where two valleys meet a town will probably spring up, even though the waterways are not navigable. Railway junctions have in recent times sprung into importance at points where lines from different parts of a country converge. This is analogous to the formation of towns at meeting-points of other artificial routes such as roads, or to the meeting of natural routes such as navigable streams.

In many cases railways play a secondary, though very important, part in town development by causing the rapid growth of places whose sites have been determined by special causes.

St. Louis, at the junction of the Missouri and Mississippi, had its site determined by the meeting of water routes. At the present time, however, it is more important as a railway town than a river town, being the converging point of a large number of lines. *Birmingham*, in our own country, is another important instance of a town not caused by railway construction, but whose great development is due to its artificial nodality. The development of *Chicago*, in the United States, is largely due to railway construction. Wherever a railway was built from any point north of Washington to the west of the country, it had to pass round the southern end of Lake Michigan. The southern extremity consequently became the meeting-

point of the routes from west to east, and became a busy trade centre. With its increase in importance other railways were built to it, because it was an important centre, and they now reach it from all directions possible. In the year 1840 *Chicago* had less than 5000 inhabitants; to-day the population is about 2,000,000.

Towns owing their Importance to Natural Wealth.

In the early days of the manufacturing industry towns sprang up, where water-power was available, on the banks of navigable rivers. The introduction of steam-power attracted the manufactures to the coalfields, where fuel was cheap. Districts where coal is abundant now tend to develop rapidly, and in relatively recent years in our own country a vast population has concentrated on the coalfields. Cheapness of transport of raw material means that it is now an easy matter to bring it to the coal, and large manufacturing towns spring up in places where fuel is abundant. The particular industry carried on in each town depends on the peculiar circumstances necessary for the special kind of work. Where iron is found with coal more industries are possible and larger towns flourish. *Essen*, in the Ruhr valley, has had a rapid growth, due to the proximity of coal and iron. It has now a population of about 300,000.

Towns always arise where valuable minerals are to be found.

The discovery of gold has, in many cases, led to the establishment and development of towns. More than half the population of Western Australia is on the goldfields, and towns such as *Coolgardie, Kalgoorlie*, and *Southern Cross* exist in the heat and drought of the desert. *Ballarat*, the richest town the world has seen for alluvial gold, has grown since 1851 from a few miners' tents to a city with a population of 50,000. *Johannesburg*, in the Transvaal, has developed very rapidly, owing to its gold-mining industry. It was founded in 1886; in 1887 the population was 3000, in 1890 27,000, and at the present day it has 160,000 inhabitants. *Kimberley*, in the Cape of Good Hope, has risen very rapidly to a town of 35,000 population, due to its enormous wealth in diamonds. The Canadian territory near Alaska has during recent

years been the scene of a great gold rush, as a result of which considerable towns have grown up. *Nome City* is said to have grown in a single season. *Dawson City* has developed in a very few years into a town with over 10,000 inhabitants. *Broken Hill*, in New South Wales, has grown rapidly, due to its great wealth in silver. The population is now over 30,000. The South Australian Government recognised the importance of the mineral field, and by a rapid extension of their railways captured the trade connected with the industry. A railway line 230 miles long carries the silver ores to *Port Pirie* for smelting.

Rich deposits of iron ore have also led to rapid town development, notably in the case of *Barrow* and *Middlesborough*. In the last fifty years they have grown into towns with 60,000 and 100,000 inhabitants respectively. The splendid position of Barrow has caused it to specialise in shipbuilding, while Middlesborough manufactures steel rails largely. The *Cleveland district* produces nearly one-half the iron ore of the British Isles. As a contrast to the development of towns due to mineral wealth, it is interesting to note the growth of *Winnipeg*, which is very largely due to its special position in a wheat-growing area. In 1870 it had barely 300 inhabitants, while now the population is over 100,000. It is further important to note that mineral wealth, however great, must ultimately become exhausted; a town whose whole life is based on its stores of minerals cannot therefore be built on a very sure foundation.

In connection with the growth of busy centres of industry other towns spring up as health and holiday resorts. The need for recreation, change of scene and pure air by the workers causes the development of coastal towns, which are fairly near the great manufacturing towns. In this way *Brighton*, and other seaside resorts in the metropolitan area, and *Blackpool*, in the Lancashire district, have become important.

Necessary Conditions for the Development of a Good Harbour.

1. The harbour must be a safe anchorage for ships, and must afford them protection from wind and waves.

2. It must have good internal and external communications.
3. It should have close proximity to a rich interior, to reduce cost of transport and to guarantee a return cargo.
4. It should be free from ice all the year.
5. Fuel should be abundant close at hand.
6. There should be freedom from heavy duties.

The best natural harbours of the world are the deep rock basins found along mountainous coasts, but these are of little use as seaports. Many of our large modern seaports have been consequently artificially constructed or deepened. The use of larger vessels has transferred trade from some of our great ports. Havre has superseded Rouen, and Pauillac has taken the place of Bordeaux.

EXERCISES.

1. State the conditions which favour the growth of large seaports. Illustrate your answer by examples.
2. Account for the rapid growth of Chicago, Barrow, and Winnipeg.
3. Say what you can of the part played by gold in the development of certain parts of the world.
4. Give an example of a district in which there are many large towns situated close together. Mention some of the causes which have brought this about in the district you name.
5. It is said that the lowland plains of the temperate zones are best suited for the habitation of civilised man. Justify this statement.
6. Account for the great density of population in the monsoon lands of Asia.
7. What were the chief conditions that determined the site of towns in early times? How have the conditions you name been modified?

Industries.

There are three great branches of industry—agriculture, manufacture and commerce—and any particular nation generally has a share of each. Comparatively minor industries, though still of great importance, are those connected with hupping and the pasturing of animals.

Success in any branch of industry must rest fundamentally with the geographical nature, such as build, climate, and economic wealth, of the land in which it is carried on. These geographical conditions have already been fully treated in the sections on the natural conditions affecting commerce. It is proposed in this section of the work to deal with the industries in order, and point out the conditions necessary for the most successful development of each.

Hunting.

This is the occupation of people who represent the simplest state of society, and their work consists mainly in gathering such food products as Nature supplies in their environment, and in hunting animals and catching fish.

Such peoples are of necessity nomadic and generally very poor. In some cases they show skill in the manufacture of their weapons, as, for example, the *boomerang* of the *Australian aborigines*, a typical people of this class. The aborigines have matchless open-air perceptive faculties, and are often employed as "trackers." Darwin quotes the case of a "tracker" following for a whole day over dry and stony hills the track of a fugitive, and ultimately discovering him. The *Bushmen of South Africa* and the *Indians of the Amazon valley* are also peoples of the simple hunting class.

The hunting peoples referred to above are to be found in the tundra, in semi-desert areas and in forests.

Hunters of a higher type are engaged in *trapping the fur-bearing animals* of the northern forests. The *Siberian* and *Canadian forests* are the chief fur-hunting grounds. The fur hunters by their labours obtain a very important commodity which has a great commercial value.

Fishing peoples may also be regarded as hunters. They are nomadic since they also follow a destructive occupation. As the sea yields fish very abundantly fishing peoples are generally richer than the hunters on land. The *Eskimos* are perhaps the only people who are purely fishers.

The *shallow waters over submerged banks* in the sea are the best *fishing grounds* in the world, such places being particularly suited for the breeding of fish, e.g., the *Great Banks of Newfoundland* and the

Dogger Bank in the *North Sea*. The fish caught in such places is mostly *cod*. The *rivers* in the *western part of North America* are specially rich in *salmon*. *Sardines* are found in many parts of the *Mediterranean*, and *pilchards* are caught off the coast of *Cornwall*. *Colchester*, *Whitstable*, and *Chesapeake Bay* are noted for *oysters*. The *seal fishery* is famous, in the *Behring Sea*, near the *Pribilof Islands*.

Pastoral Industries.

The pastoral industry is carried on in the grass-lands of the world, and, to a minor degree, in the cold tundra. The industry is very widespread, since in each continent a proportion of the area is under grass. Grass-lands have different names in the different continents, being known as *steppes* in *Europe* and *Asia*, *prairies* in *North America*, *llanos* and *pampas* in *South America*, *downs* in *Australia*, and *savannas* in *Africa*.

Two sets of climatic conditions must be considered as giving rise to large areas of grass. The first necessary condition is scarcity of rainfall, the amount necessary for grass being smaller than that for forests but larger than that in the desert. In this sense the steppes are the connecting link between the northern temperate forests and the hot deserts. The second condition for grass production is high temperature and two seasons as regards rainfall, wet and dry, the latter being long compared with the former. The savannas produced under these conditions are the connecting link between the hot deserts and the tropical forests.

Peoples following the pastoral industry can be practically self supporting, since the animals they tend, or the products they derive from them, supply food, clothing, and shelter.

Pastoral peoples are of necessity nomadic, due to the constant demand for "pastures new" and the need of suitable winter quarters. The nomadic aspect of the industry has, however, been modified in modern times. The sheep rearing carried on in *Australia* and the cattle ranching of *America* are hardly of a nomadic nature. The proprietor of a ranch or sheep run often owns a very large stretch of territory, but it is regulated from one fixed dwelling. Minor outposts are established, and the horse is used for quick transit. Under such

conditions as these the industry has very little in common with the mode of life among the shepherds of the Asiatic steppes. The industry is often, also, associated with agriculture, the two combined being known as "mixed farming." In this case the amount of land held would be comparatively small and the nomadic aspect would entirely disappear.

It is important to note that sheep flourish best on short, dry upland pasture, while cattle are best suited to longer, damper lowland pasture.

The commercial importance of the pastoral industry is very great, the two chief products being the *flesh* and *hair* or *woolly coat* of the animals reared on the grass lands.

The *importation* of *meat*, principally *beef* and *mutton*, into our country, is shown to be tremendous from the fact that in 1911 the average consumption of foreign meat was 54½ lbs. per head. As has been stated in an earlier section, modern cold storage renders the importation of meat quite easy and safe. The *importation* of *wool* is also very great; in 1911 799,896,221 lbs. of wool came into Great Britain. Other products are *hides*, *potted meats* and *meat extracts*. *South America* has come to the front in recent years with *potted meats* and *meat extracts*: *Fray Bentos* manufactures *Liebig's Extract of Meat*, *Bovril Co.* have large ranches in the *Argentine*, and *Paysandu* is noted for its *potted ox tongue*. In *North America* large numbers of *pigs* are reared near the maize belt, and *Chicago* specialises in *pork packing*.

Agriculture.

Agriculture was carried on among early peoples in an elementary manner, and it is still carried on among the most simple societies of the world in the same way. It has, however, become a very advanced art among some of the nations of the world. Three factors are of great importance for successful agriculture, namely, *climate*, *soil*, and *labour*.

Climate.

Each product has its own special requirements for successful cultivation. Plant life is however most abundant and varied under tropical conditions, where heat and moisture are at the maximum, and

the minimum of labour is necessary. Very low temperatures, extremes of temperature, and conditions of drought are unfavourable to agriculture.

Soil.

Each product has in this, also, its own special requirements, in order that the best results may be obtained. Since soils are the source of plant food they tend to become exhausted when crops are raised. Manuring, therefore, becomes necessary when land has to some degree become impoverished. Decaying animal and vegetable matters form valuable manures by dividing and pulverising soils and by the evolution of carbon dioxide. At the present time artificial fertilisers are manufactured from natural phosphates, fish, bones, guano, blood and many other substances. The value of a manure depends upon its richness in phosphates, nitrates, or potash.

Fertility in soils is also maintained by a rotation of crops. The Norfolk rotation of crops—barley, clover, and wheat—is based on scientific principles. In Anglo-Saxon times the rotation was fallow, wheat, and oats or barley.

In fruit growing a rich soil has a tendency to produce woody fibre and excess of foliage. A soil of close texture is the best, but clay soils should be avoided. In Florida fruits are grown on barren land which is dressed regularly with manure.

Labour.

Labour questions are at present a great cause of anxiety in the agricultural industry, especially in our own country. There is a great scarcity of farm labour, which is the result of several causes. The development of the manufacturing industry, which is centred in the towns, coupled with the attractions of town life, had led to a great depopulation of the rural districts. Again, the increase in the demand for women in factories, offices, and domestic service has added to the centralisation of the population in the towns at the expense of the agricultural areas. For the last forty years in Great Britain there has been a steady decrease in the numbers working on the land, the decrease in the females being much greater than that in the males.

In the colonies an effort is being made to

attract an agricultural population by free or cheap grants of land.

In tropical countries labour questions are always important. Native labour is always best suited to climatic conditions, but it is always difficult to obtain, for the climate makes the natives disinclined for work.

The Agricultural Holdings Act of 1883, which was amended in 1900, provides compensation for all improvements effected on a holding. This is a direct encouragement for agricultural development.

Mining.

In the mining industry climatic conditions are very seldom considered. Valuable deposits of mineral wealth have always attracted miners no matter where the minerals have been situated. Physical conditions are, however, of the utmost importance. Minerals are usually associated with the older rocks, and are generally discovered in mountainous districts. In some cases, however, running streams have carried minerals from the highlands to the valleys, where they are sometimes discovered.

Mining is a costly operation, and the development of the industry in any locality depends on the wealth of the mineral deposit, the cost of bringing it to the surface, and the cost of transporting it to the area where it is required.

Since the mineral wealth of any area must ultimately become exhausted, the mining industry in any locality cannot become permanently established. In Australia, for instance, several towns were formerly noted entirely for their gold production, but to-day it is their agricultural wealth which is important. Bathurst, in New South Wales, once a gold-mining camp, is now the centre of an important wheat area. Ballarat is more flourishing to-day than it ever was at the top of the mining boom, and this is entirely due to the development of the agricultural resources of the country round it. One important feature of agricultural progress is the large number of men, hitherto engaged in mining, who have taken up farms.

The condition of the government in a country has an important bearing on the mining industry, inasmuch as it affects the investment of capital necessary for mining operations. China has great

wealth in coal, but so far it has hardly been touched.

EXERCISES.

1. "Stock-farming is a most important occupation in large parts of the British Empire." State the position of the chief regions for which this is true, and account for the importance of the industry in these parts.
2. Say what you can of the early and also the present importance of Ballarat in Australia.
3. Why are labour questions a cause of great anxiety in the agricultural industry in our own country?
4. Explain how a rotation of crops can maintain fertility in soils.
5. Say what you can of the commercial importance of the pastoral industry.
6. Locate the chief fishing grounds of the world, and state the special kinds of fish caught in each.

Manufactures.

Modern manufactures are carried on on a very elaborate scale, and can only be successfully developed when several important conditions are satisfied. The first two essentials are *power* and *raw material*. In early times the source of supply of the raw material determined very largely the location of the home-centred manufacturing industries, because of the difficulties presented by questions of transport. At a later period power was obtained from running or falling water and the moving wind. The early factories were therefore generally situated by the sides of running streams, as near as possible to the source of supply of the necessary raw material. The woollen industry of Yorkshire sprang up because the sheep of the Pennines supplied the raw material and the running streams supplied the necessary power.

At the present day transport is so easy and cheap that the supply of raw material is not the first consideration in establishing an industry. The first considerations now must be the possession of coal and the proximity of coal and iron. In the textile industries especially, climatic conditions become of very great importance; in some others the nature of the water supply is a very important question. The dexterity of the workers is always important in industrial

life, and the disposal of the finished products has always to be considered.

The following are the chief points to be considered in the manufacturing industry:—

1. *Climate.*

Tropical and subtropical conditions are unfavourable to the development of manufactures on any extensive scale. The chief manufacturing countries are situated in the North Temperate Zone, e.g., Great Britain, Germany, France, United States (north-eastern part). Temperate conditions are best suited since they are most invigorating, and temperate parts are consequently peopled by the most industrious and energetic peoples.

A humid climate is specially favourable to the development of textile industries, particularly to the manufacture of cotton and linen goods. *Lancashire*, on the western side of the Pennine range, has developed the cotton industry to such an extent, due to its excellent climate for the work, that it has become the most important locality in the world for cotton goods. In that area the towns having the most humid climate specialise in cotton spinning, e.g., *Oldham* and *Bolton*. In *Yorkshire* the humid atmosphere of the *Aire valley* is favourable to textile industries, and the woollen industry has developed. The textile industries of the United States are centred in *Massachusetts* on account of the humid climate in that state. In some parts of the United States the air is artificially moistened in order that cotton manufactures can be carried on. In Germany the textile industry is located mainly in the *Ruhr valley*, the western part of the country deriving most benefit from the moisture-laden winds of the Atlantic. On the other hand, flour-milling requires a dry atmosphere, and suitable conditions have caused the industry to be important at *Minneapolis* and *Budapest*.

2. *Power.*

Hand-power was the first kind used in manufactures, but its great disadvantage was that the output was very restricted; it could, however, be employed at any centre conveniently situated for a supply of raw material. It is still used in Ireland and the

Hebrides in tweed manufacture. Water-power was used at a very early stage, and caused the output to increase considerably. It had the effect of concentrating the manufacturing population near running water. With this motive power the industries were, if possible, carried on in the districts where the raw material was obtained. The woollen industry was then carried on in a large number of centres of practically equal importance. Thus the district of the Cotswolds, the Welsh highlands, the Pennine slopes, and the Tweed valley, each supplying raw wool and running water, became equally important for woollen manufacture.

The invention of the steam-engine and the use of steam-power in manufactures have caused the coalfields to play an important part in the distribution of the manufacturing industries. The centres already established on or near coalfields made rapid progress because their fuel was very cheap. Other industries, not so fortunately placed, were at a very great disadvantage, since the cost of transport of coal is very great. They either declined or sank into comparative insignificance. The woollen industry, already established in *Yorkshire*, developed very greatly, due to the local coal, while the Cotswold woollen manufacture, although a speciality, never reached great dimensions. A further advantage of the introduction of steam-power was that it made the importation of raw material easier and cheaper. The coalfields of the world are now areas of dense population, due to the rise of the great manufacturing towns.

In recent years *electric power* has been largely used in the industrial world. Falling water is the cheapest source of energy that can be used for the generation of an electric current, and there is, at man's disposal, a tremendous amount which is now running to waste. The *Falls of Niagara* and some of the *Swiss streams* are used as a source of power, but there is an inexhaustible amount still available in different parts of the world. The great advantage with this form of power is that it can be transmitted through wires to any convenient centre. Any great advance in the application of electricity to manufactures would probably ultimately shift the dense populations back again to running streams and falling water.

3. *Iron in Conjunction with Coal.*

Where iron and coal are found in the same locality the importance of each is greatly increased. Iron is necessary for the manufacture of machinery, and fuel is essential to smelt iron ore. If coal is not found near the iron ore transport charges become very heavy, due to the great weight of the commodities. The close proximity of the two materials consequently leads to the development of the smelting industry; their proximity in a manufacturing district leads to the manufacture of machinery.

In the *Clyde valley* coal and iron are found, and iron smelting is important at *Wishaw*, *Coatbridge*, and *Motherwell*. On the *South Wales* coalfield the local brown hematite is smelted.

The smelting of iron ore is facilitated if coal, iron, and limestone are found in conjunction, the limestone being used as a "flux."

4. *Raw Material.*

Raw material is an essential in all manufactures. It has already been shown that the distribution of raw material plays an important part in the establishment of industries. Other examples will emphasise this.

Areas with an abundant supply of timber develop industries connected with that material. *Scandinavia* lies in the coniferous forest belt, and manufactures *matches*, *window frames*, *doors*, and other articles from wood. *Canada* has an abundant supply of *timber* in the eastern part, and in the *St. Lawrence basin* the *lumber trade* is of very great importance. *Ottawa* is the chief town of the world for the *lumbering industry*. *Saw-milling* and the *manufacture of paper* from wood pulp are of great importance. In each country named the excellent waterways and supply of water power have played an important part in the development of the industries connected with timber.

Countries in which the *vine* flourishes develop the wine-manufacturing industry. Thus *France* manufactures *champagne*, *claret*, and *burgundy*, and *Spain* produces *port* and *sherry*. *Italy*, *Hungary*, *California*, *Cape Colony*, and *Australia* each grow the *vine* and manufacture *wine*.

Districts suitable for *mulberry* growing also rear the *silkworm* and manufacture *silk*.

Lyons is the first town of importance for the manufacture of *silk* and the *South of France* is an important area for the mulberry. The mulberry plant is indigenous to China, and *China* was the first country to manufacture *silk*. Silk was worn in China in the days when the inhabitants of Britain were barbarians.

Deposits of *salt* in the neighbourhood of coal lead to the development of the *chemical industry*, and in conjunction with *silica* to *glass manufacture*. *St. Helens*, on the Lancashire coalfield and near the Cheshire salt area, has a large *chemical industry*. *Soap* is mainly prepared from *tallow* and *vegetable oils*, and its manufacture is usually carried on at ports near coalfields suitably placed for the importation of these raw materials. *Birkenhead*, near Liverpool, is an important example.

Supplies of *fruit* from local orchards have caused the development of *jam making* at *Dundee* and *London*. A large production of *rye* in *Holland* has led to the manufacture of *Scheidam gin*. Quarrying of oil shale in the *Lothians* has caused *paraffin* industries to spring up at *Bathgate*. The tremendous yield of salmon in the rivers of western *North America* has created a large export trade of *tinned salmon*.

Although many cases can be quoted in which raw material gives rise to local industries, yet it is quite common for material to be worked up at considerable distances from the area in which it is produced. The cost of transport must add to the cost of the finished products when material is not manufactured locally; but there is often no alternative. Certain raw materials must be carried to the coalfields of the temperate zones, and the cost of transport affects each manufacturing area almost to the same degree. It is only when the cost of carriage of material is large in comparison with its actual worth that an important objection is raised. In the manufacture of earthenware a large amount of material is used, and articles of small cost are manufactured, while in the manufacture of china the articles produced are made from a smaller amount of material, and have a much greater value. We thus find that the pottery industry of England is established in the locality where the rough clay is found, and the kaolin of Cornwall is carried by water and land to that area.

We therefore conclude that since raw material is essential in all manufactures, it must be obtained at all costs. Where possible, and especially in new countries, the industries will depend on the raw material actually possessed; but parts of the world which have special advantages for manufacturing will obtain their raw material from the best possible sources, wherever they are situated.

5. Labour.

In all cases where manufactures are the result of hand labour, great skill is necessary. This is acquired as the result of much practice, and becomes a characteristic of the operatives. India is noted for its hand-made muslins, silks, embroidery, shawls, and filigree work. The Chinese have long been known for their skill in hand work, their silk work being specially famous. The Mexicans, although illiterate, do quite artistic work. Their silver and gold thread filigree work is of great beauty. 14622

Shortage of labour retards manufactures. This is conspicuous in our colonies. Some of them, as for example, Australia and Canada, are admirably fitted for the manufacturing industry in every respect save as regards labour.

The difficulties presented by coloured labour have already been mentioned.

In the great manufacturing countries of the world labour is required mainly for working and controlling machines, but this class of labour is also quite skilled. Where an industry has been long established in a certain locality the workers there become masters of their trade. Their skill becomes sufficiently great to give their industry a fair safeguard against the competition of newly established rivals.

6. Nature of the Water Supply.

Since water can dissolve many of the substances found in the crust of the earth, and the nature of the crust varies in different localities, it follows that water may vary considerably as regards the substances it has in solution. This is an important point in many manufactures, and in some it becomes the chief consideration.

In the *brewing industry* water containing gypsum in solution is needed. The industry is consequently important at *Burton, Edinburgh, and Dublin*. In

most of the textile industries bleaching and dyeing are important processes, and the water-supply must be suitable in order that they may be carried on successfully. The *linen* industry flourishes in *Ulster*, partly on account of the nature of the water, and for the same reason *silk work* is important in *Macclesfield* and neighbouring towns, and at *Lyons*. *Perth* specialises in *dyeing*, due to the peculiar suitability of the water-supply. For washing flax, water should be free from lime salts. The water of the *Lys* in *Belgium* is very suitable. In the manufacture of *paper* very pure water is needed. The industry flourishes at *Edinburgh* and *Maidstone*, mainly because of the suitability of the water. *Penicuik*, in the *Esk* valley, manufactures *paper*, since the water of the *Esk* is suitable for the industry.

7. Disposal of Finished Product.

Important manufacturing districts have a very large output, and facilities for the disposal of their products must be considered. If they are suitably placed for the importation of raw materials they will also be suitably placed for export, and the transport charges simply increase prices. The home market must, however, be considered, and this often determines where some manufactures are carried on.

It determines that *cotton machinery* shall be made in *Lancashire*, *woollen machinery* in *Yorkshire*, and *agricultural machinery* in the wheat area at *Ipswich*. In all large cities such as *London, New York* and *Chicago* the manufacture of *clothing* is important, so that the local demand may be cheaply gratified. Similarly large towns such as *New York, Edinburgh, and London* become important publishing and printing centres, and also localities dealing largely with food products.

8. Other Considerations.

A locality having special advantages for a particular manufacture will obtain great renown. Thus *Sheffield* has become world famous for its *cutlery*, mainly because in its locality a suitable stone for sharpening iron and steel is found. *Batley*, in *Yorkshire*, occupies a central position among the chief woollen towns, and is thus conveniently placed for collecting waste materials. It has de-

veloped a special industry in the manufacture of *shoddy*. *Reading*, on the Thames, is in the wheat area, and has concentrated on the manufacture of *biscuits*. *Campbeltown*, in *Argyllshire*, distils *whisky*, since it is situated in an important barley area. *Luton* is in the heart of the wheat area of England, and has specialised in industries in which *straw* becomes the chief raw material. *Leghorn* has similarly obtained fame for *straw industries*. *Naples* has become well known for *macaroni*, since the district of *Apulia* produces hard wheat suited for its manufacture.

World's Shipbuilding (total for eight years).

United Kingdom . . .	11,973,000 tons
Other Countries . . .	7,999,000 "

Chief Ports of United Kingdom.

London . . .	24 mill. tons
Liverpool and Birkenhead	23'6 "
Tyne Ports . . .	16 "
Southampton . . .	11'3 "
Hull . . .	8'2 "
Plymouth . . .	7'5 "
Glasgow . . .	7'1 "
Dover . . .	4'5 "
Swansea . . .	4'4 "
Newport . . .	4'3 "
Middlesborough . . .	4'3 "
Grimsby . . .	3'6 "
Leith . . .	3'4 "
Blyth . . .	3'3 "
Sunderland . . .	3'2 "
Manchester . . .	3'2 "

Chief Shipbuilding Ports of United Kingdom.

Glasgow, Newcastle, Sunderland, Greenock, Middlesborough, Hartlepool, Belfast, Barrow, and Birkenhead.

Chief Coal Ports of United Kingdom.

Cardiff, Tyne Ports, Newport, Swansea, Hull, Blyth, Sunderland, Methil, Grimsby, Port Talbot, Burntisland, Glasgow, * Leith, and Grangemouth.

Foreign Tonnage using British Ports.

Germany . . .	15'3 mill. tons
Norway . . .	11 "
Denmark . . .	5'9 "
Sweden . . .	5'9 "
Holland . . .	5'9 "
France . . .	3'7 "
Spain . . .	3 "
Belgium . . .	2'9 "
Russia . . .	2 "
Italy . . .	1'4 "

Railways of United Kingdom.

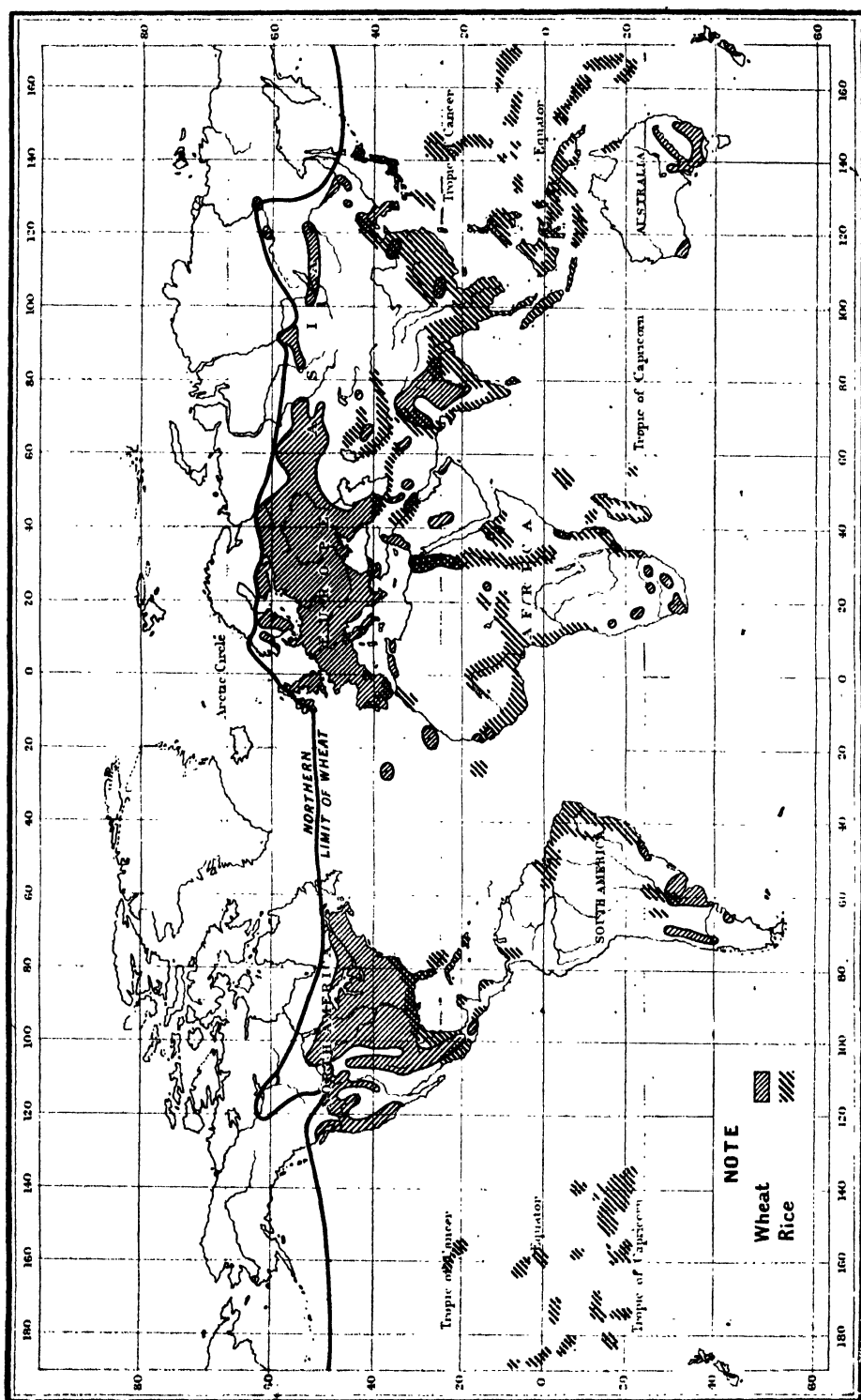
England and Wales . . .	16,223 miles
Scotland . . .	3,815 "
Ireland . . .	3,401 "
Total	23,441 miles

Canals of United Kingdom.

England and Wales . . .	3,641 miles
Scotland . . .	184 "
Ireland . . .	848 "
Total	4,673 miles

EXERCISES.

1. What are the most important conditions necessary for the development of manufactures on a large scale?
2. Which manufacturing industries are dependent on climatic conditions for their satisfactory development?
3. State the manufacturing industries which need special peculiarities in the available water supply.
4. Give full reasons for the great development of the manufacture of cutlery at Sheffield.
5. Account for the importance of—
 - (a) Iron smelting at Middlesborough.
 - (b) Manufacture of gin in Holland.
 - (c) Distilling of whisky in Scotland.
 - (d) Manufacture of matches in Sweden.
6. Why has Ulster become so important for the manufacture of linen goods?
7. Account for the manufacture of chemicals in South Lancashire and for the manufacture of biscuits at Reading.
8. Why have Ipswich and Grantham become noted for the manufacture of agricultural machinery?
9. Why is the industrial importance of coal greatly increased by the presence of iron and limestone in the same district?
10. Account for the development of the jam industries of London and Dundee.
11. "Rope making is an important industry in the seaports of Britain nearest to the Baltic Sea." Give reasons for this.
12. Norwich is noted for the manufacture of mustard. Why is this?
13. Where is the soap-making industry of Britain chiefly located? State why the industry has developed in the parts you name.



DISTRIBUTION OF WHEAT AND RICE.

COMMERCIAL ATLAS GEOGRAPHY

CHAPTER II.

THE WORLD'S PRODUCTS.

CONTENTS.

Food Products—Cereals, Beverages, Fruits,
Meat—Dairy Products—Other Food Pro-
ducts.
Textile Products—Dyes.
Forest Products—Palms.
Other Vegetable and Animal Products.
Marine Products.
Mineral Products—Industrial, Building,
Precious

MAPS.

7. Distribution of Wheat and Rice.
8. Distribution of Barley, Oats, Rye, and Millet.
9. Distribution of Tea, Coffee, Cocoa, Wine,
Maté, and Potatoes.
10. Distribution of Animals.
11. Distribution of Animal Products.
12. Distribution of Sugar Cane, Sugar Beet,
and Coconut.
13. Distribution of Cotton, Flax, and Hemp.
14. Distribution of Tobacco and Jute.
15. Distribution of Maize, Date Palm, and
Banana.

Food Products.

Cereals.

Wheat.

Wheat is grown over a wide climatic range, but, generally speaking, it flourishes best in areas having a warm summer, fairly wet spring, and a fairly dry, warm autumn. The soil best suited for its cultivation is one of a clayey nature. The range of latitude over which wheat is grown is so great that harvest occurs in some country at every season of the year. A continuous supply of this important cereal is thus insured, and disaster due to bad harvests in any one locality is avoided. This is particularly important to the great industrial countries of the world which depend on imported wheat for an adequate food supply.

Though suitability of climate and soil are the first considerations in wheat cultivation, it is necessary for successful operations on a large scale that other points should be considered. Foremost among these are cost of land, adoption of scientific methods and the best agricultural machinery, and the presence of suitable means of transport for the carriage of the grain in bulk.

The *United States* is the largest wheat producer in the world owing to the possession of a rich virgin soil, a suitable

climate, and a magnificent transport system. The chief wheat-producing states in that country are *Minnesota*, the *Dakotas*, *Kansas*, and *Nebraska*. A very large part of the crop is exported.

Russia, *Austria-Hungary*, and *Rumania* are the chief European countries raising sufficient to have a surplus for export.

India, although tropical, has a large production of wheat, the crop being raised during the winter months.

Canada, *Australia*, and *Argentina* have made rapid strides during recent years, and may now be classed among the important wheat-producing countries.

Wheat Production.

European Russia	104,694,000 quarters
United States	91,292,000 "
India	44,811,000 "
France	38,954,000 "
Italy	26,973,000 "
Canada	25,947,000 "
Germany	21,378,000 "
Hungary	20,828,000 "
Siberia (and Steppes)	17,245,000 "
Argentina	16,438,000 "
Spain	13,758,000 "
Australia	11,510,000 "
Rumania	10,083,000 "
United Kingdom	7,087,000 "

Wheat Production in British Empire.

India	44,811,000 quarters
Canada	25,947,000
Australia	11,510,000
New Zealand	1,000,000
South Africa	750,000
Cyprus	300,000

Macaroni.

Macaroni is a preparation, generally in tubular pieces, made from wheaten flour. The best kind is manufactured near

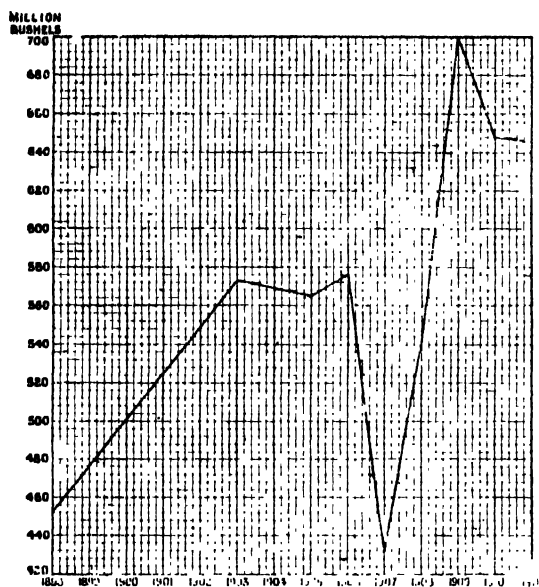


Fig. 4.—Wheat Production of British Empire.

Naples from the Apulian wheat. *Vermicelli* is a similar preparation but of a more thread-like nature.

Barley.

Barley has a very wide range of cultivation, being grown in most wheat areas and in districts too cold for wheat production. It is cultivated in almost the extreme *north of Norway*, but flourishes best, however, in the cool temperate zone. The most suitable soil for this cereal is a light loam.

Barley was at one time largely used for bread-making, but wheat has now taken its place.

It is now used on a large scale in the *brewing and distilling industries* for the manufacture of *beer and whisky*. *Canadian barley* is sent to the United States for that purpose.

Scottish barley is the grain deprived of its

husk, and *pearl-barley* has, in addition, the outer coat removed.

Barley Production.

Russia	65,954,000 quarters
United States	21,004,000 „
Germany	20,240,000 „
Austria-Hungary	18,651,000 „
Canada	8,867,000 „
United Kingdom	8,204,000 „
Spain	7,647,000 „
France	6,028,000 „

Oats.

Oats can be produced in areas which are too cold and damp for the growth of wheat and barley. They therefore flourish in the northern part of Britain and Europe.

Oats Production.

United States	136,003,000 quarters
Russia	112,891,000 „
Germany	68,620,000 „
Canada	42,654,000 „
France	38,385,000 „
Austria-Hungary	29,852,000 „
United Kingdom	20,660,000 „

Rye.

Rye is cultivated where climatic conditions are similar to those necessary for oats. It can be produced where soils are very poor. It is largely used for the manufacture of *bread* in the chief rye-producing countries of Europe, such as *Russia* and *Germany*. The chief use, however, is in *distilling*, the *United States* manufacturing *whisky*, *Holland gin*, and *Russia vodka*.

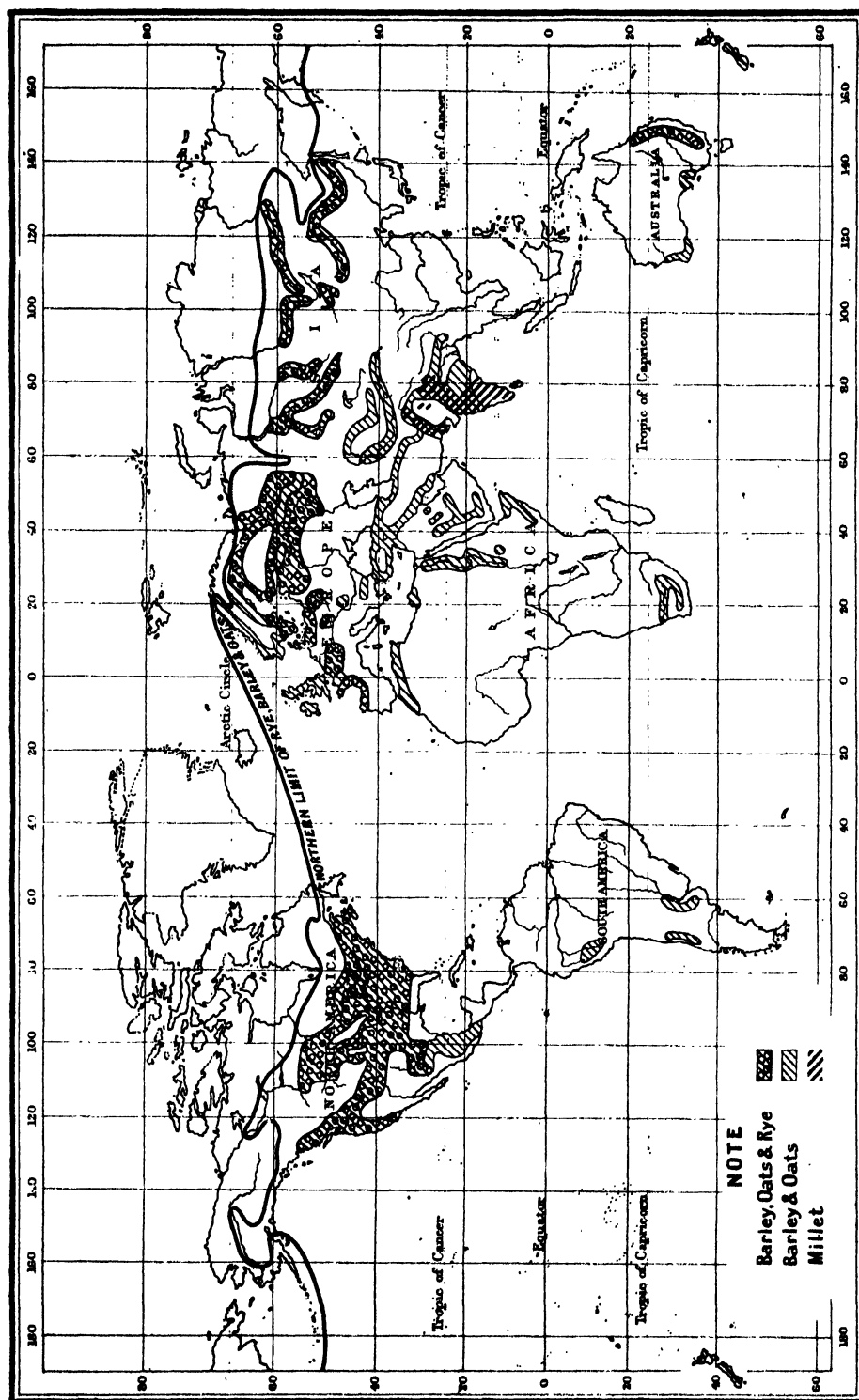
Rye Production.

Russia	113,363,000 quarters
Germany	56,121,000 „
Austria-Hungary	19,748,000 „
France	6,381,000 „

Maize.

Maize is indigenous to the *United States*, and is still the largest cereal crop of that country. It requires a fairly high summer temperature and a moderate rainfall. It can be produced in the *south of England*, but does not reach perfection. It is put to many uses, but chiefly as a human food and for fattening animals.

Cornflour is the chief form in which it appears as an article of diet, but in the *United States* it is made into *hominy*. As an animal food it is used on a very wide scale. The *meat-packing industry* of the



DISTRIBUTION OF BARLEY, OATS, RYE, AND MILLET.

United States is concentrated in the maize belt, and has assumed great dimensions. This is because maize is the chief food for the cattle and swine reared in that area.

Starch is another product from maize, and a very extensive use of the cereal is for the manufacture of *whisky*.

Maize Production.

United States	298,518,000	quarters
Austria-Hungary	13,832,000	"
Rumania	13,775,000	"
Italy	12,025,000	"
Russia	8,490,000	"

Millet

Millet flourishes in hot regions which are fairly dry. In *India* it is grown in the *Deccan* and the *Indus basin*, and, with rice, forms the staple food of the natives. In *Africa* it is produced in the hot, dry *Sudan*, and is an important local food crop.

Rice.

Rice is a tropical product, and requires a very high temperature and a very heavy rainfall. The climatic conditions in the *monsoon lands of Asia* are admirably suited for its cultivation, and those lands yield the bulk of the world's crop. During certain periods of its growth rice must be submerged, and consequently swampy areas, low lands near the sea, and the deltas of rivers in tropical countries are favourable localities.

Export.

India	£22,000,000
China	14,000,000
Siam	5,000,000
Persia	700,000
Japan	500,000

Farinaceous Foods.

Tapioca (Cassava).

Cassava is a tropical product growing in the form of a shrub about 6 feet high. It is cultivated with very great ease. *Tapioca* is prepared from the juice of the root of the plant. In parts of *South America* the root, freed from juice, is grated and baked, and is known as *cassava bread*.

Cassava is grown in *tropical America* and *Africa*, the *West Indies* and the *East Indies*.

Export of Tapioca.

Straits Settlements	£1,149,000
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Sago. (See the Sago Palm.)

Arrowroot.

Arrowroot is the starch obtained from the roots of a number of plants. The chief supplies are obtained from the *West* and *East Indies*. *English arrowroot* is obtained from potatoes.

EXERCISES.

1. What are the climatic conditions necessary for the cultivation of rice? Name the chief countries of the world which have a large rice export, and the chief ports concerned.
2. Where are the chief wheat-growing regions in Europe? Account for their positions, and compare them with the regions where rye is the most important crop.
3. The south-eastern part of England is the chief wheat-producing area of the British Isles. State as fully as you can why this should be so.
4. Name the chief areas, outside the monsoon lands, which produce rice.
5. Which are the chief areas of the world for maize production? What industries usually spring up where this cereal is grown in large quantities?
6. Name the countries, in their order of importance, from which Britain imports wheat.
7. Say what you can of the food products which are prepared from oats.
8. Why does the United Kingdom produce very little rye and no maize?

Beverages.

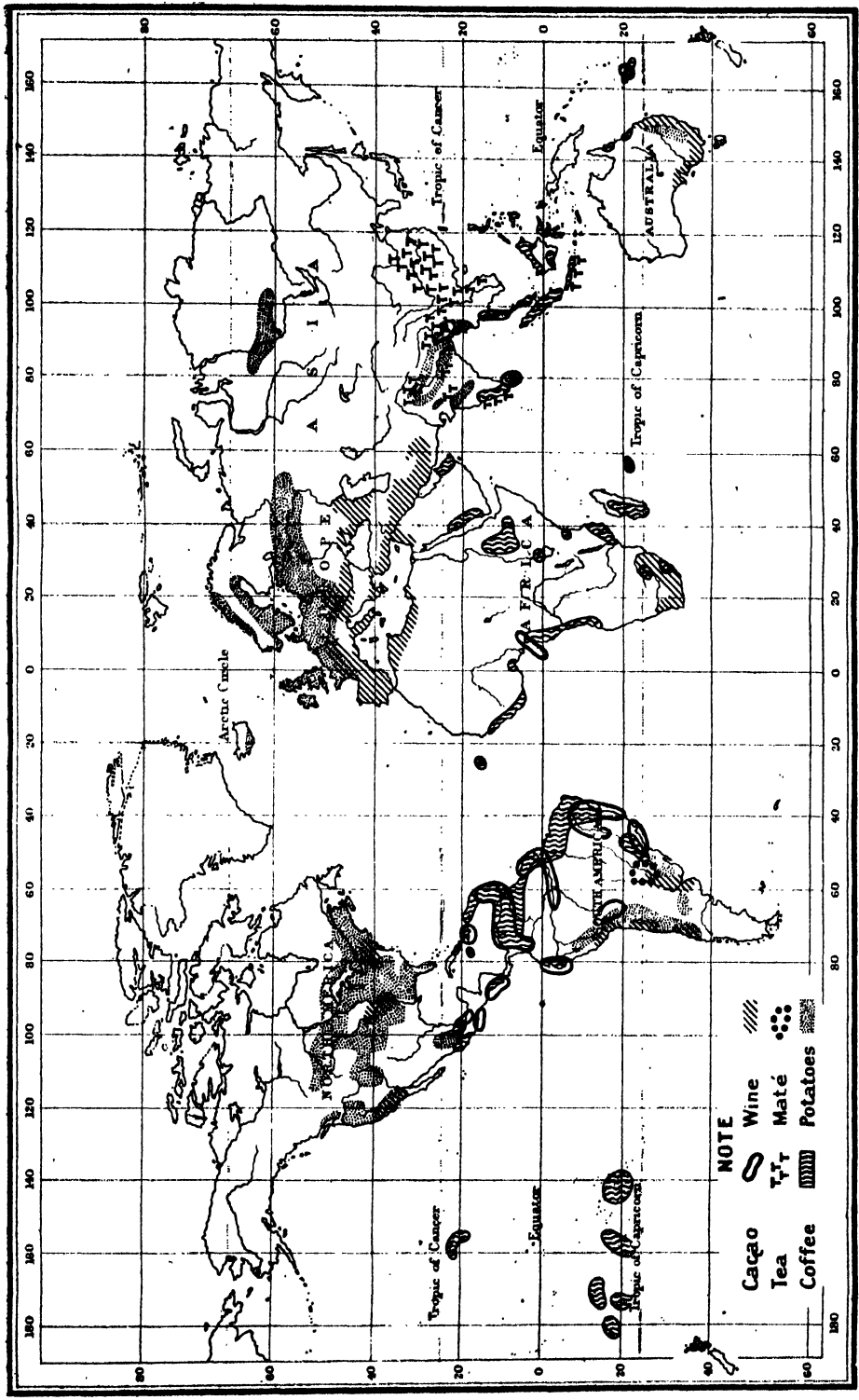
Tea.

The tea plant is not so susceptible to cold as the coffee shrubs, and consequently has a greater range of cultivation.

The conditions necessary for its successful growth are great heat, heavy rainfall, a soil containing vegetable refuse and iron, and a situation sheltered from violent winds. Although the plant has need of a good supply of moisture, it is easily damaged by excessive dampness at the roots. It therefore grows best on sloping land with a system of natural drainage.

It is to *China* that we owe the cultivation and use of tea; in fact, there are traditions of its cultivation more than 2000 years B.C. It was not, however, until 1657 that it came into use in England.

The export of the product from British



DISTRIBUTION OF TEA, COFFEE, ETC.

possessions during recent years has increased at a wonderful rate. *Ceylon* has made the most remarkable progress, tea supplanting coffee in many plantations. The production of tea is practically confined to certain localities in the *monsoon lands of Asia*.

The name tea is given to the dried leaves of a small evergreen shrub. It is raised

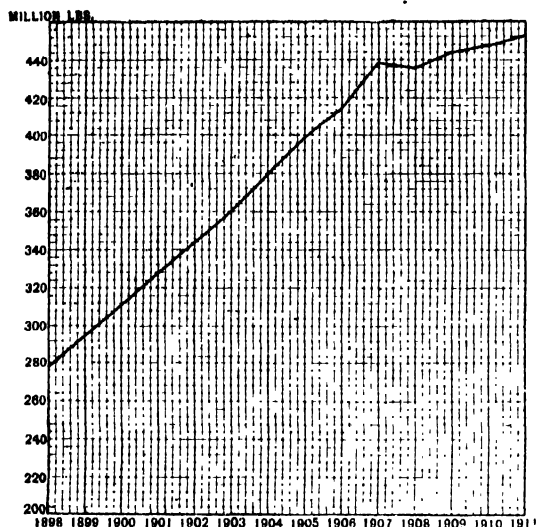


Fig. 5.—Tea Production of the British Empire.

from seed, and, after the third year of growth, the leaves are gathered four times a year.

China tea is noted for its delicate flavour, while *Indian teas* are marked by their strength. By judicious blending the distinguishing features of each kind may be combined.

Tea Production.

China	1,769,000,000 lbs.
India	295,954,000 „
Ceylon	192,020,000 „
Japan	74,287,000 „
Java	52,634,000 „

Tea Export.

India	£8,863,000
Ceylon	5,588,000
China	5,154,000
Japan	1,347,000
Dutch East Indies	1,118,000
Formosa	890,000

Coffee.

For the successful cultivation of coffee the site must be most carefully chosen. It should

be well sheltered from violent winds and have a soil rich in decayed vegetation. The climate must be very hot and moist. Generally speaking, coffee is a purely tropical product.

Coffee consists of the seeds of an evergreen shrub indigenous to *Abyssinia*. It was not until about 1650 that it was introduced into Britain as a beverage.

In our own country and Europe generally, the beverage is made as an infusion, but in the East it is made as a decoction. A combination of the two methods gives the best results.

It is a stimulant, but, in excess, acts as a poison. It is an antidote to poisoning by opium and alcohol.

Blue Mountain coffee—grown on the slopes of the *Blue Mountains in Jamaica*—is noted for the delicacy of its flavour. It is, however, costly, due to the small output. *Brazil* has a very large production, the area behind *Santos* being specially noted. *Central America* and the *north of South America* are also important areas. The *Mocha coffee of Arabia* is well known, but the production is small.

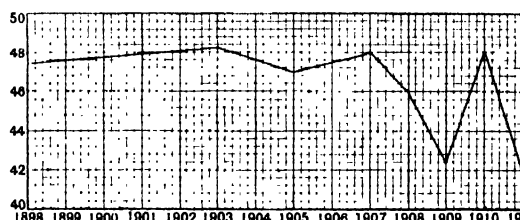


Fig. 6.—Coffee Production in British Empire.

The practice of blending is followed as in the case of tea, and with the same results.

Coffee Export.

Brazil	£41,000,000
Haiti	6,000,000
Dutch East Indies	5,000,000
Colombia	3,500,000
Venezuela	3,300,000
Guatemala	2,200,000
Mexico	1,200,000
India	1,100,000
Costa Rica	730,000
Nicaragua	600,000

(Also exported from San Salvador, Honduras, Ceylon, Porto Rico, Jamaica, Ecuador, British Guiana, and Trinidad.)

Cocoa (Cacao).

The conditions necessary for the cultivation of cocoa are very much the same as those for coffee, *i.e.*, a very warm, moist soil containing a large proportion of decayed vegetation, and having adequate shelter from winds. It, also, is consequently a tropical product, and is indigenous to *tropical America*.

Cocoa essence consists of pure cocoa deprived of about half of its natural fat.

Chocolate consists of ground cocoa deprived of a portion of its fat and sweetened with sugar; in addition, it often contains some flavouring matter.

Cocoa is mainly obtained from the *northern states of South America*, the *West Indies*, *Trinidad*, and the *Gold Coast*.

Cocoa Production. (Metric ton = 2204.6 lbs.)

Gold Coast . . .	39,500 metric tons.
Ecuador . . .	35,500 "
San Thomé . . .	35,500 "
Brazil . . .	30,500 "
San Domingo . . .	20,900 "
Trinidad . . .	18,900 "
Venezuela . . .	12,500 "

Cocoa Export.

Ecuador . . .	£1,975,000
Gold Coast . . .	1,643,000
Brazil . . .	1,594,000
San Thomé . . .	1,346,000
Trinidad . . .	1,272,000
Venezuela . . .	810,000
San Domingo . . .	750,000

Hops.

The hop is native to *Europe*, and is a perennial plant sending out twining stems. The fruit is used for *brewing* and *medicinally*. The cultivation of the hop is carefully attended to in *England*, *Kent* and *Hereford* being the most important counties for its growth. It is also extensively grown in *Germany*, *France*, *Austria-Hungary*, *Belgium*, *Canada*, *Australia*, and the *United States*.

Spirits.

Brandy is obtained by the distillation of wine. It is principally manufactured in the district round *Cognac* in *France*. *California* and *Spain* have a large export of brandy.

Gin is produced by the distillation of malted liquor with the addition of the oil of juniper. *Holland's gin* is noted, and is obtained from *Schiedam*.

Rum is obtained from molasses by fermentation. The dark colour is produced by the addition of burnt sugar. *Jamaica* is noted for its rum, and the spirit is exported from *Demerara*.

Whisky is obtained by distillation from malted barley or other cereals. In *Scotland* and *Ireland* is made chiefly from barley malt, and in the *United States* from maize malt.

Cider is a fermented liquor manufactured from the juice of apples. It contains from 5 to 10 per cent. of alcohol. In *England* it is manufactured chiefly in the counties of *Worcester*, *Hereford*, and *Devonshire*. It is also largely made in *France*, *Germany*, and *North America*.

Perry is a fermented liquor manufactured from pears. It contains from 5 to 9 per cent. of alcohol. In *England* it is prepared in the counties of *Worcester*, *Hereford*, *Devonshire*, *Gloucestershire*, and *Somersetshire*. It has a peculiar aroma and flavour.

Fruits.*The Vine.*

The vine is best cultivated in countries having the *Mediterranean type of climate*, that is, with warm, dry summers, mild winters and winter rains. It is enabled to stand drought, due to its long root, which enables it to secure water from underground sources. The chief essentials for successful growth are a prolonged autumn to bring the fruit of the plant to maturity and sloping land facing the direct sunlight. The vine is susceptible to the phylloxera insect pest, but the American plants have mostly become immune.

Vine-growing is generally carried on for the manufacture of wine. The chief vine-producing countries are those noted for the wine-making industry. Thus *France*, *Spain*, *Italy*, *Austria-Hungary*, *Australia*, and the *United States* are the chief wine-producing countries of the world.

Burgundies are produced in *France* and *Australia*. In France the chief area is near the source of the Seine round the towns of *Dijon* and *Beaune*. *Australian burgundy* is produced mainly in the state of *Victoria*.

Champagne is a *French* wine, and is produced in the valley of the *Marne*.

Claret is also *French*, and comes from the area round *Bordeaux*. It is also produced in *Australia*.

Tokay is a *Hungarian* wine. The *Hungarian* Government support its manufacture by the establishment of institutions giving instruction in vine-growing and wine-manufacture.

Chianti, *Capri*, and *Marsala* are *Italian* wines, being produced respectively in *Tuscany*, *Naples*, and *Sicily*.

Port and *Sherry* come from the *Spanish* peninsula, the former from the districts round *Oporto* and *Tarragona*, and the latter from the southern part near *Xeres*.

Hock and *Moselle* are produced in *Germany*.

Californian wines are increasing in importance.

Algerian wines are important, and are largely sent to *France* to be blended with *French* wines.

Around *Cape Town* the growth of the vine is responsible for the manufacture of a considerable quantity of wine, but this is of inferior quality.

Fresh grapes are exported from many vine-growing countries, this being rendered possible by modern cold storage methods. The vine area of *Cape Colony*, round *Cape Town*, exports large quantities of grapes.

Raisins are dried grapes. They are exported largely from *Spain*, *Australia*, *California*, *Asia Minor*, and *Turkey*.

Currants, a small species of grape, are produced in *Greece* and the *Ionian Islands*. The area round *Patras*, in *Greece*, is of special note in the currant industry.

Wine Production.

France . . .	1309.5 million gallons.
Italy . . .	979.6 "
Spain . . .	368.4 "
Algeria and Tunis	155.3 "
Australia . . .	6.2 "
(mainly S. Australia and Victoria)	

Olives.

The olive is indigenous to the *Mediterranean* area of *Europe* and *Africa*, and is very largely cultivated in *Italy*, *France*, *Greece*, and *Tunis*. The fruit is very often pickled and used as a table delicacy.

When the fruit is compressed about 30 per cent. of the weight is extracted as *olive oil*. The best olive oil is used for salads, and frequently replaces butter in *Southern Europe*. Inferior oils are used in the manufacture of soap.

Olive Oil Export.

Italy	£1,830,000
Greece	841,000
Tunis	175,000
Algeria	82,000

1. Temperate Fruits.

Apples are grown well to the north in the temperate zone but flourish best in more southerly parts. The chief supplies are obtained from *Canada*, *Tasmania*, *New Zealand*, *Australia*, and the *United States*. The *Vale of Annapolis* in *Nova Scotia* is noted for its apple orchards. *English apples* have a good reputation.

Oranges thrive best in the warm temperate latitudes. *Spain*, *Portugal*, *Italy* and *Malta* in the *Mediterranean* area have a large output. *Seville* and *Maltese* oranges are noted. *Florida* and *Southern California* have a very large production and are noted for their orange groves. *Los Angeles*, in *California*, produces the famous seedless navel orange.

Under tropical conditions oranges are largely cultivated in the *West Indies*.

Lemons are a *Mediterranean* product. *Sicily* exports large quantities from *Messina*. *Italy*, *California* and *Florida* also have a large production.

Figs are exported from *Turkey*, *Asia Minor* (*Smyrna*), *Italy* and *Greece*.

Almonds are produced in the *Mediterranean* area, and are largely exported from *Spain*. *California* also produces them. *Valencia* and *Jordan almonds* are the best-known varieties in trade.

Pears are widely cultivated in *Europe*, but require more care and attention than apples. *British Columbia*, *California* and *Tasmania* have a large production.

Plums are very widely produced in the temperate zone. They are cultivated best on soils containing lime.

Fruit Export.

United States	£7,415,000
Italy	4,910,000
Turkey (figs, nuts, dates, grapes)	3,936,000
Spain (mainly oranges)	3,842,000
Greece (mainly currants)	1,890,000
Canada	1,000,000
Persia	850,000
Algeria (large part dates)	849,000
Servia (mainly prunes)	716,000
Hawaii	700,000

Fruit Export—continued.

Tasmania	£350,000
Morocco (almonds)	170,000
Porto Rico (oranges)	150,000
Rumania	89,000

2. *Tropical Fruits.*

Bananas are grown in great abundance in tropical lands and are largely used as food. Very little care and trouble are needed in their cultivation. The *West Indies*, *Tropical America* and *Africa*, the *Canary Islands* and *Northern Australia* are the chief sources of the supplies for commerce.

Pine-apples need great summer heat and freedom from winter frosts. They are grown mainly in the *Azores*, *West Indies* and *Florida*.

Pine-apple Export (Fresh and Tinned).

Straits Settlements	£367,000
Porto Rico	360,000
Siam	29,000

Cuba exported 26,000 tons.

Florida export included in U.S.A. fruit.

Banana Export.

Jamaica	£1,241,000
Costa Rica	1,019,000
Colombia	399,000
Honduras (including Br. Hond.) . .	311,000
Guatemala	168,000

Cuba produced 40,000 tons.

Florida export included in U.S.A. fruit.

EXERCISES.

1. Name the chief tea-producing countries of the world. What are the climatic conditions necessary for the successful cultivation of tea?
2. What are the chief regions where coffee is grown? What are the special conditions necessary for its cultivation?
3. Name the chief vegetable products used in brewing and distilling.
4. Which are the chief vine-growing countries of the world? Name the chief wines of commerce and the areas from which they are derived.
5. Give a list of the chief fruits of the Mediterranean area of Europe.
6. Write a short account of the progress made in vine cultivation in Australia.

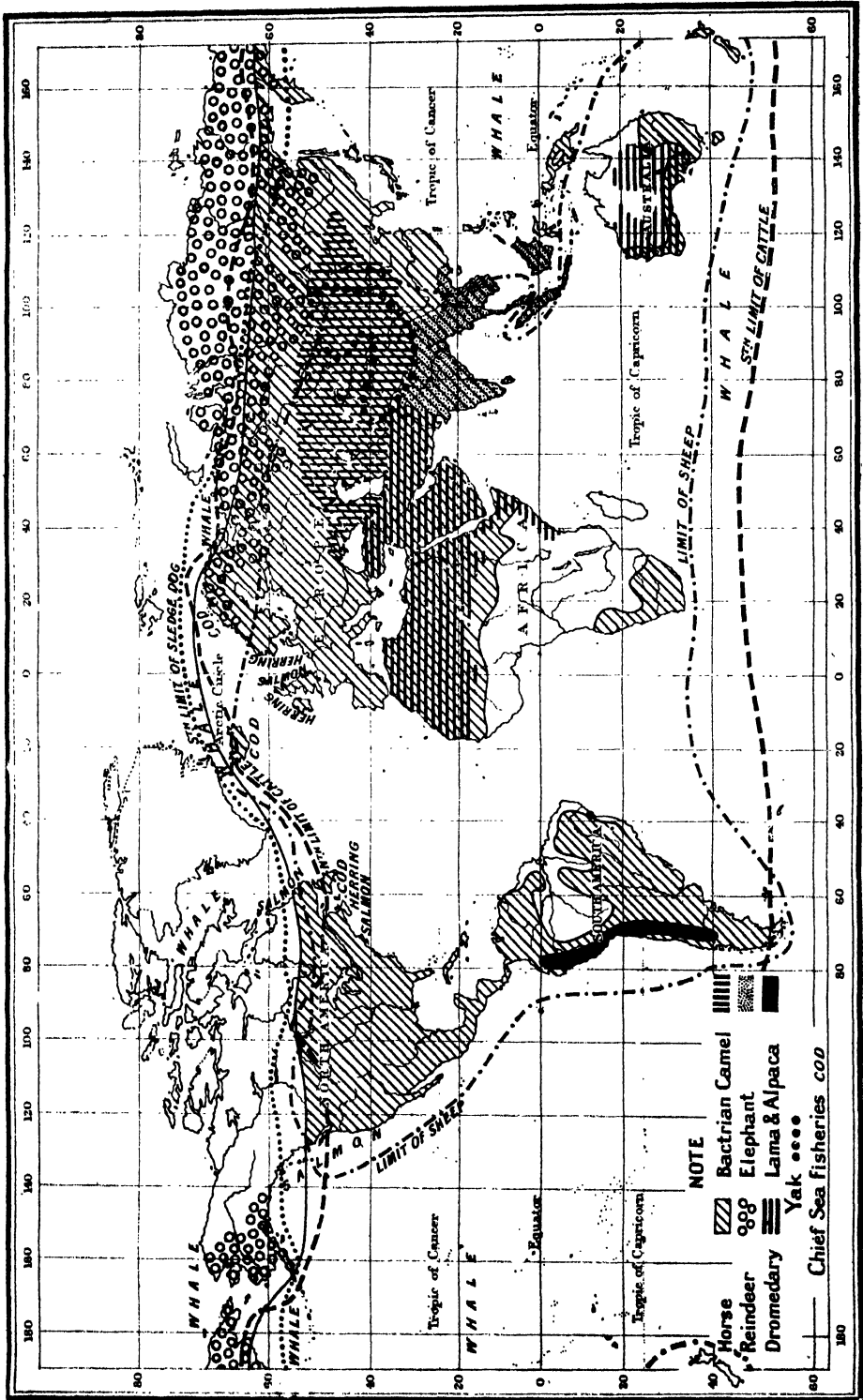
Meat.

Domestic animals are reared for food on the grass lands of the world, and cheap pasturage is the chief factor determining the sources of the meat supply. The rise of the manufacturing industry and the development of the factory system in some countries have greatly added to the importance of those areas of the world suitable for cattle and sheep rearing on a large scale. The meat trade of the world has been greatly encouraged and increased by the discovery of processes for preserving flesh. Markets thousands of miles away from the pasture lands can now be supplied with fresh meat. There are two important methods which can be adopted. Refrigeration, or storing meat in chambers which are kept below freezing point, is very successful. By this method *Australia* and *New Zealand* supply large quantities of beef and mutton to the European markets. The other means adopted is by preserving in air-tight vessels. This method is particularly suitable for the preservation of meat and other foods carried by explorers, travellers and soldiers. The *meat-canning* industry has developed to a great extent in recent years in the *United States*, *South America* and *Australia*.

The *United States* have a very large *cattle-raising* industry, the animals being reared chiefly for food. There is consequently a large export of meat. In *South America*, in the *Plate River* region, cattle are reared in large numbers, and there is a large export of *meat*, *tallow*, *hides*, *meat extract* and *tinned meat*. *Fray Bentos* and *Paysandu* are important towns for *meat extract* and *tinned meat* respectively. *Australia* and *New Zealand* have large flocks of sheep, and export a tremendous amount of *mutton* and *lamb*. *Canterbury lamb*, from the *Canterbury Plains* of *New Zealand*, is noted. In *India* a large number of cattle are reared, but they are used mainly for draught purposes. In *Russia* cattle are kept chiefly for *tallow* and *hides*.

Export of Meat.

Argentine (and skins)	£31,999,000
United States	30,777,000
New Zealand	3,910,000
Australia	2,618,000
Uruguay (and extract)	1,586,000
Canada	1,110,000



DISTRIBUTION OF ANIMALS.

Cattle in British Empire.

India . . .	111,714,000
Australia . . .	11,577,000
South Africa . . .	7,028,000
Canada . . .	6,965,000
New Zealand . . .	2,020,000
Ceylon . . .	1,465,000
East Africa . . .	775,000
Uganda . . .	732,000

(Sheep in British Empire, *see* Wool.)

Bacon.

Pigs are reared on a large scale in countries producing *maize*, notably the *United States*, *Austria Hungary* and *Germany*. In the *United States* the industry is particularly large and has led to the development of pork packing and bacon curing on a large scale. *Chicago*, *Kansas City*, *Omaha* and *Milwaukee* are the chief centres for *pork packing* and *bacon curing*. The export of *lard* in great quantities is also an outcome of the pig-raising industry. *Canada* and *Denmark* have during recent years developed the *pig-raising* and *subsidiary* industries.

The British Isles are comparatively unimportant for the breeding of pigs, yet they have acquired fame for the quality of their bacon and hams. Thus *Irish*, *Wiltshire* and *Westmoreland* bacon, *York* and *Cumberland* hams are world famed.

Tallow is an animal fat which is produced in large quantities in the great sheep and cattle-rearing parts of the world. It is of great value in the manufacture of soap and candles.

Lard is the fat derived from pigs. The *United States* has a very large output of this commodity owing to the very extensive scale in which the rearing of swine is carried on in the *maize* area to the east of the *Mississippi* valley.

Tallow Export.

Australia . . .	£1,550,000
United States . . .	1,264,000
New Zealand . . .	685,000

Dairy Products.*Milk.*

The milk of commerce is mainly that of the cow. The milk trade is one of great importance, owing to the large demand for milk as an article of food and the necessity

for large supplies in the manufacture of butter and cheese.

It is important that the sources of supply of milk should be near the areas where it is to be consumed, owing to the difficulty in keeping it in a fresh state for any lengthy period of time. We thus find that the populous area in the east of the *United States* receives its supply of fresh milk from the pasture land of the *Appalachians* and not from the great prairies where cattle rearing is so extensively carried on. For a similar reason it is clear that foreign competition need not be considered in the milk trade, though it is a very important factor in the trade with *butter* and *cheese*.

Condensed milk is largely manufactured in *Switzerland*, and in this form it can be kept in a fresh state for a very long time.

Butter.

Butter is prepared from the fatty substances in milk. It is a product which is in great demand and whose price has consequently risen during recent years. A cheaper substitute, *margarine*, has now a great sale. Cold storage methods have largely increased the list of countries from which butter is exported, *Australia* and *New Zealand* now sending considerable quantities to our country. *Denmark*, *Ireland*, and *France* are specially noted for their butters, and *Holland*, *Russia*, and *Canada* have also a large production. *Holland* has also a large export of *margarine*.

Export of Butter.

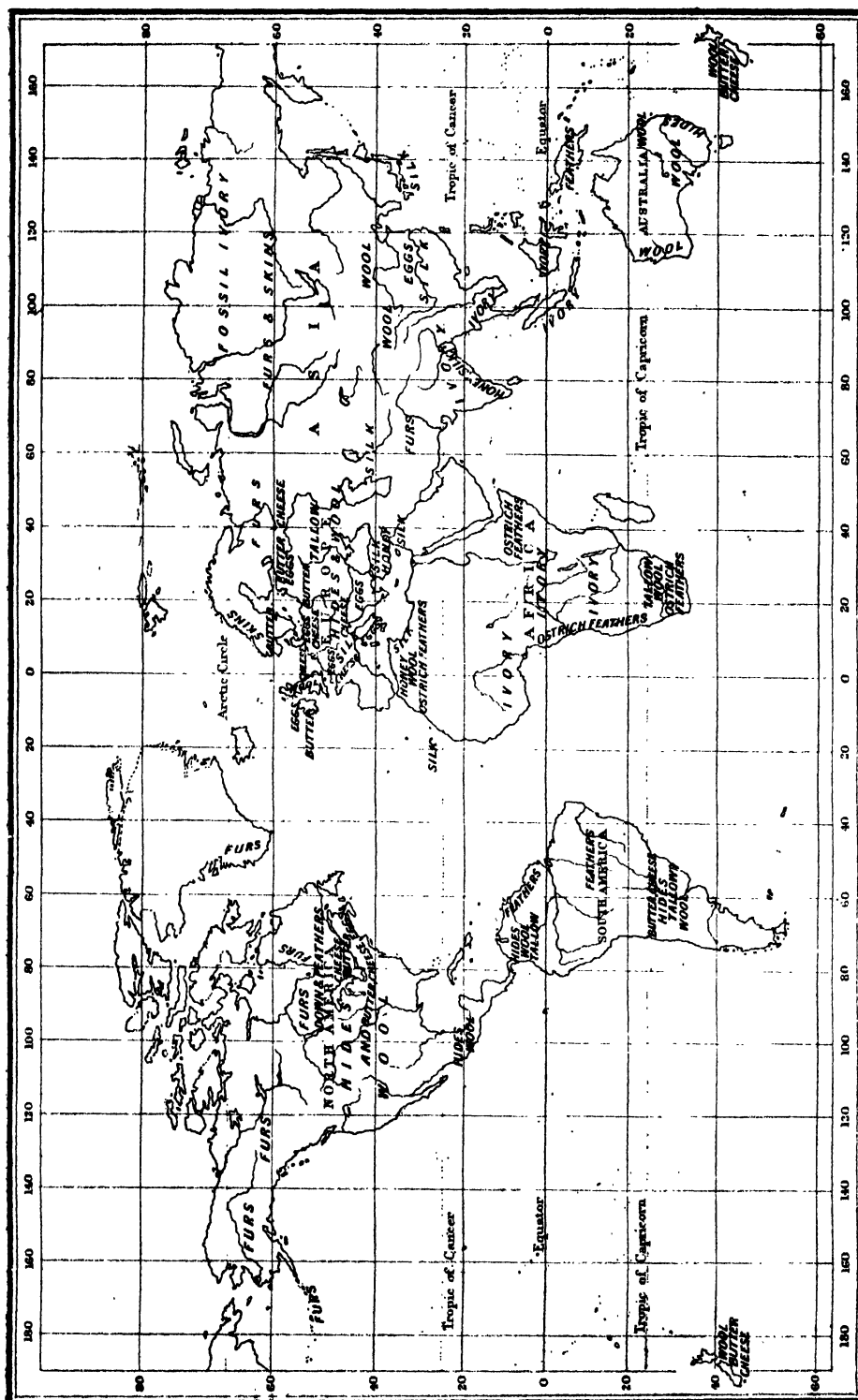
Denmark . . .	£10,365,000
Russia (all dairy produce) . . .	9,064,000
New Zealand (with cheese) . . .	3,769,000
Australia . . .	3,343,000
Holland . . .	3,266,000
France . . .	2,196,000
Finland . . .	1,425,000
Canada . . .	46,000

Export of Margarine from Holland £4,968,000.

Cheese.

Cheese, like butter, is produced from milk. There are many different kinds, each involving a slight variation in the process of manufacture. The chief English varieties are: *Cheddar*, made in *Somersetshire*, *Stilton*, made in *Leicestershire*, and *Cheshire* cheese.

Map 11.



DISTRIBUTION OF ANIMAL PRODUCTS.

The most important foreign kinds are *Gruyère* (Swiss), *Gorgonzola* (Italy), *Camembert* (France), *Limburg* (Belgium), *Brie* (France), *Roquefort* (France), and *Dutch cheese*.

Canada has a very large export of cheese, the industry having been built up during quite recent years.

Export of Cheese.

Canada	£4,144,000
Italy	2,979,000
Holland	1,735,000
France	500,000

Export from New Zealand included with Butter.

Eggs.

In most countries eggs are an important article of food. In Great Britain the demand is greater than the home production, and necessitates a large import trade. *France, Russia, Canada, Belgium, Denmark, and Germany* export large quantities.

Poultry rearing for the English market is also an important industry in *France* and *Canada*. The grain production in these countries is a great aid to the rearing of poultry.

Export of Eggs.

Russia	£9,658,000
Denmark	2,100,000
Italy	1,986,000
Austria-Hungary	1,320,000
Holland	400,000

For Fish see Marine Products.

EXERCISES.

1. Make a list of the countries in which cattle are kept largely for dairying.
2. Name the special cheeses of the world and the areas in which they are manufactured.
3. Which are the chief countries for the export of (a) beef, (b) mutton, (c) potted meats, (d) meat extracts?
4. Write a short account of the importance of cold storage as applied to the meat trade.
5. Name the chief countries from which Britain imports dairy produce.
6. Name, with their markets, the great meat-producing countries of the world.

Other Food Products.

Sugar.

There are few countries where sugar in one form or another is not produced to some extent. Fifty years ago, however, the zone of cultivation was limited to the tropics, all sugar at that time being obtained from the sugar cane. The sugar cane requires, for its successful production, a moist coastal soil containing lime and a high temperature. Such conditions are only found in tropical countries.

With the utilisation of the sugar beet the area capable of sugar production was vastly extended, since the beet can be grown in all

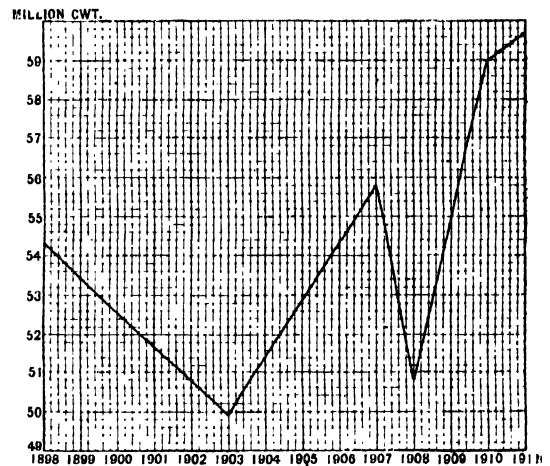


Fig. 7 — Sugar Production of British Empire.

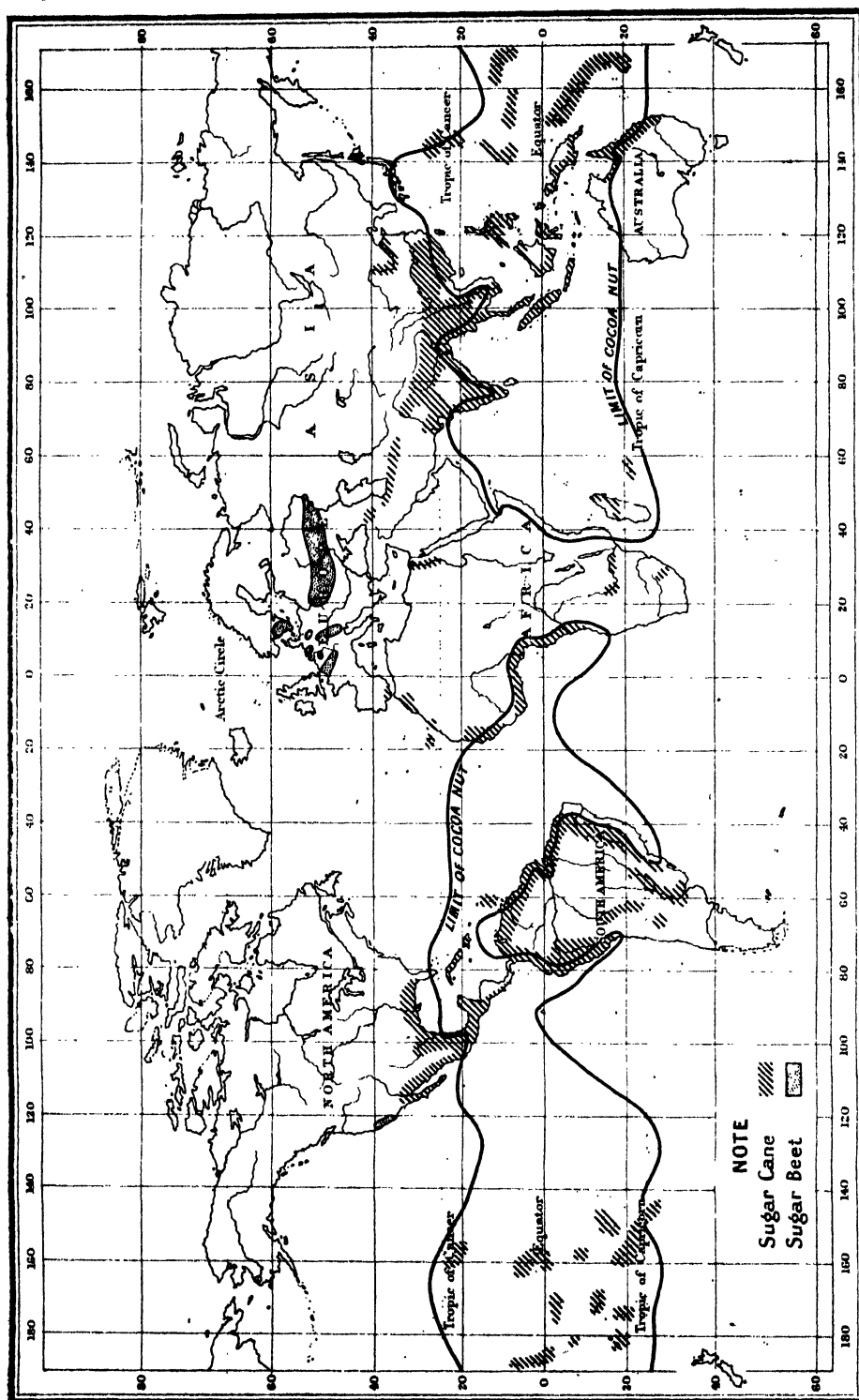
temperate countries. During recent years *Germany, France, Austria, Russia, and Italy* have developed the industry to such an extent that they are now able to export sugar.

Recent experiments show clearly that the sugar beet can be grown quite as successfully in our own country as on the continent of Europe.

In the northern part of *North America* sugar is obtained from the *sweet maple*. The manufacture is, however, very small.

Molasses is the uncrystallised syrup obtained by boiling down raw sugar. It is a thick, sticky, dark brown, semi-liquid substance. *Rum* is obtained by fermenting *molasses*. Our chief supplies come from *Jamaica* and *Demerara*.

Map 12.



DISTRIBUTION OF SUGAR CANE, SUGAR BEET, AND COCOANUT.

Cane Sugar Export.

Cuba (total production)	1,896,000 tons
Dutch East Indies (total production)	1,444,000 „
Mauritius	£2,349,000
Philippines	1,895,000
Santo Domingo	1,188,000
British Guiana	1,019,000
United States	774,000
Fiji Islands	672,000
Martinique	550,000
Trinidad	540,000
Barbados	313,000
India	175,000
Jamaica	133,000

Molasses Export.

Barbados	£384,000
British Guiana	75,000
Mauritius	12,000
Fiji Islands	7,000

Rum Export.

Martinique	£369,000
British Guiana	149,000
Jamaica	67,000

There is a large manufacture of rum in Réunion.

Beetroot.

The beetroot is a product of the temperate zone and prefers light soils. There are two important varieties, the red and white. The *red beet* is chiefly used as an article of food, and the *white beet* is used for the manufacture of sugar.

Chief Sugar-Beet Areas in Europe.

Russia	1,863,000 acres
Germany	1,319,000 „
Austria-Hungary	1,113,000 „
France	519,000 „
Holland	153,000 „

Potatoes.

Potatoes require a well-drained, rather rich soil, and are cultivated chiefly in temperate countries. They are an important article of the diet of the people of Europe, and in many parts, especially *Eastern Germany* and *Ireland*, they form the staple food of the peasants.

Germany is the chief potato-producing country and has a small export, but, generally speaking, owing to great bulk, the expense of transit is too great for a large export trade. New potatoes are, however, imported by *Great Britain* from the *Channel Islands*, and by the *United States* from *Bermuda*.

Potatoes are largely used in *distilling*. Large quantities of *brandy* are made from *potato starch*. In *Germany* and *Belgium* the distilleries use the potato in the manufacture of *spirits*.

Onions.

Onions are cultivated over a very wide range of latitude, extending from the north of the temperate zone to the tropics. There are a large number of varieties, the *Spanish* and *Portuguese* being best known. They are bulbous plants, and the smaller bulbs have more pungency than the larger ones.

Spanish Export of Onions to British Isles, £702,000.

Honey.

Honey is a vegetable product deposited by bees in the cells of their combs. It varies in colour from white to dark yellow. The honey obtained early in the year is of the greatest value. The flavour depends upon the plants from which it is obtained by the bees.

Its chief value is for domestic uses, but it is also used *medicinally* and in making *mead*.

Spices.

The largest production of spices takes place in the tropics, since high temperature and heavy rainfall are essential for the cultivation of most varieties. There are, however, a few which are produced in the temperate zone. The *Malay Archipelago* is the source of most of the tropical spices.

1. *Tropical Spices.*

Cloves are the dried, unopened flower-buds of an evergreen tree. They are native to the *Moluccas*, but are now produced in many tropical parts. The best varieties are obtained from *Zanzibar*, *Pemba*, and *Penang*. They are used for flavouring, and for the distillation of the *oil of cloves*.

Export of Cloves for Zanzibar, £342,000.

Cinnamon is the bark of a laurel indigenous to *Ceylon*. It is also cultivated in the *Seychelles*, *Java*, and the *West Indies*. Its chief use is as a *spice*, but it is also used as a *medicine* and in the manufacture of *incense*.

Export of Cinnamon for Ceylon, £189,000.

Nutmegs are the kernels of the fruit of a tree largely cultivated in the *Moluccas*

COMMERCIAL ATLAS GEOGRAPHY.

or *Spice Islands*. They are also produced in *Penang*, *Ceylon*, and the *West Indies*.

Mace is the inside covering of the nutmeg.

Pepper is obtained from the berries of a climbing plant grown principally in the *Strait Settlements*, *Java*, *French Indo-China*, and *India*. *Black pepper* is obtained by crushing the whole berries, while for *white pepper*, the husk is first removed. *Red pepper* (*Cayenne*) is indigenous to *South America*, but is now produced in many tropical parts.

Allspice or *pimento* is largely cultivated in *Jamaica*. It is also produced in the *West Indies*, and grows well on poor soils.

Ginger consists of the underground stem of a plant indigenous to *Asia*. It is now largely cultivated in *Jamaica*, *China*, and *West Africa*.

Vanilla is native to *tropical America*, but is now produced in *Java*, *Ceylon*, and the *Seychelles*. It is largely used in flavouring confectionery.

Export of Spices.

Straits Settlements	£1,822,000
India	625,000
Grenada	37,000

2. Temperate Spices and Condiments.

Mustard consists of the ground seeds of the mustard plant, which is grown in many parts of *Europe*, especially in the east of *England*.

Coriander seed is largely used as a flavouring in confectionery and in the preparation of liqueurs. The plant from which the seed is derived is cultivated in *Europe*.

Caraway seeds are obtained from a plant easily cultivated in temperate latitudes. They are very largely used in *cooking*.

Anise fruit (aniseed) is obtained in *Germany* and *Spain*. It is used in confectionery and in the manufacture of liqueurs.

EXERCISES.

1. What are the chief conditions necessary for the cultivation of the sugar-cane? Name the countries having a large export of cane sugar.
2. Name the chief spices of commerce, and the areas in which they are produced.
3. Say what you can of the manufacture of rum and molasses.
4. Which countries of the world have

a large production of (1) potatoes, (2) onions? Give reasons.

Textile Products.

Cotton.

Cotton is one of the most valuable of Nature's productions. It prefers a dry, warm soil, but it can be grown in soils of various kinds, which are mainly determined by climatic conditions. It cannot flourish in regions where frost occurs, and, while it does not require great moisture, long, warm summers are essential to ripen the seeds.

Cotton is the soft down surrounding the seeds of the cotton plant. There are two great varieties known to commerce—the *Oriental* and *Occidental*.

The *Oriental*, sometimes called *Surats*, is, as the name implies, indigenous to *Asia*.

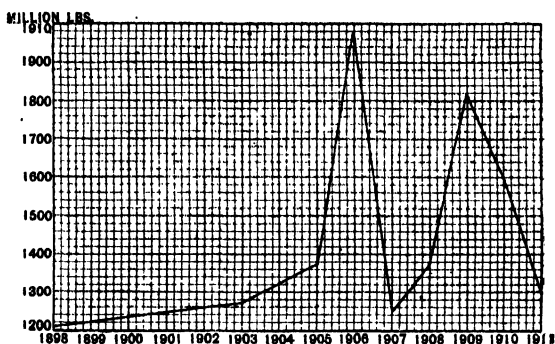


Fig. 8.—Raw Cotton Production of British Empire.

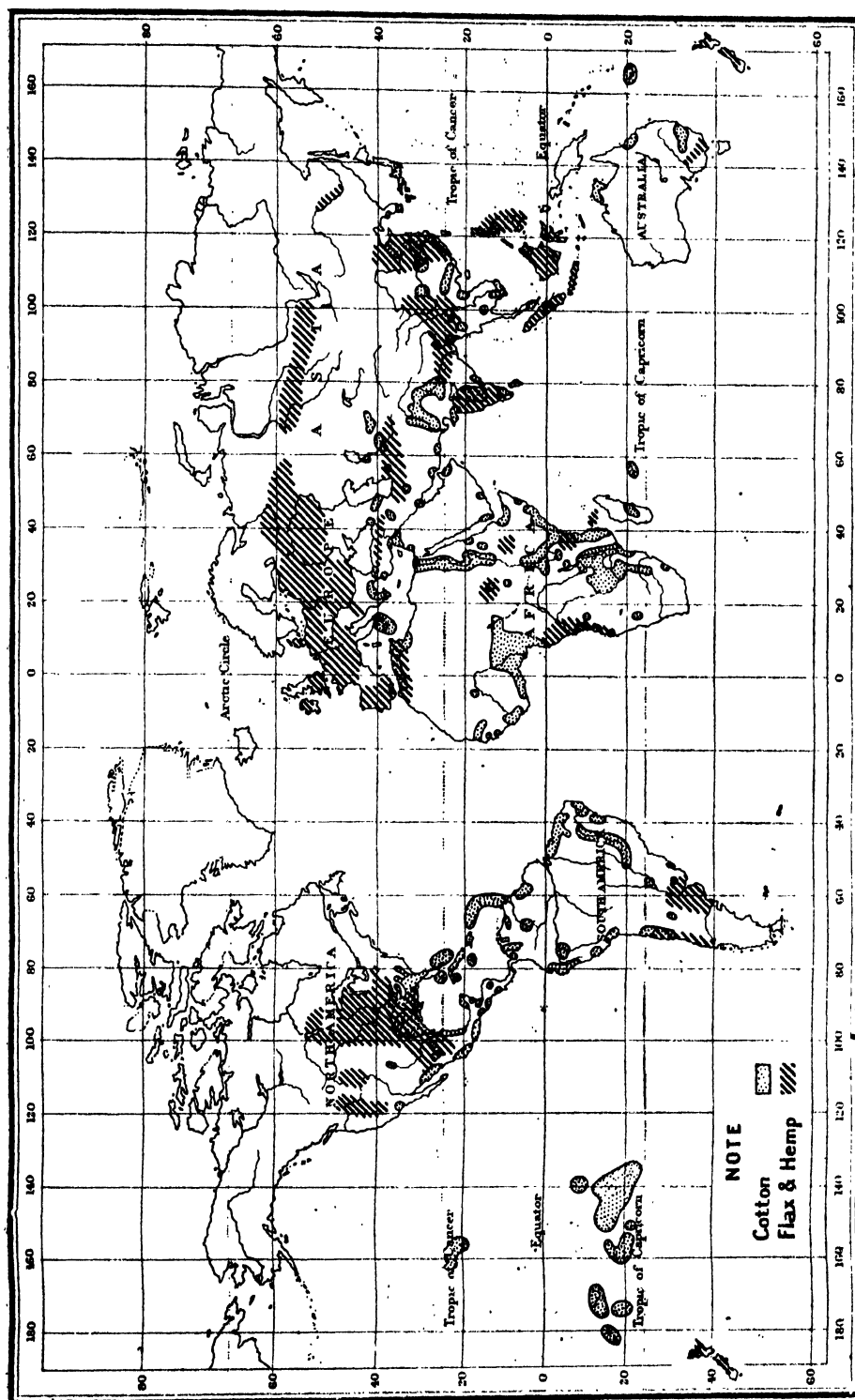
The best samples of the variety are produced in the *Central Provinces of India*.

The *Occidental* cotton is indigenous to the *United States*. There are two varieties—the *Sea Island* and the *Upland*.

The *Sea Island* is grown on the small islands off the coast of *Georgia*, and the *Upland* in the district between *New Orleans* and the coast of *Georgia*.

Serious attempts have been made during recent years to extend the cultivation of cotton in the British Empire. Great progress has been made in many parts of our *African dominions* and in *Queensland*.

Before the present century the *West Indies* was the chief source of supply, but the cultivation there has been neglected for the sake of sugar—a more profitable crop.



DISTRIBUTION OF COTTON, FLAX, AND HEMP.

Cotton Export.

United States	£112,075,000
Egypt	26,479,000
India	18,927,000
China	2,632,000
Persia	1,721,000
Uganda	314,000

Cotton Production in British Empire.

India	1,758,000,000
Uganda	10,510,000
Southern Nigeria	4,373,000
Cyprus	3,648,000
Nyasaland	3,238,000
Leeward Islands	1,072,000

(Also produced in Ceylon, Australia, East Africa, Gold Coast, Bahamas, Jamaica, St. Lucia, St. Vincent, Barbados, Grenada, Trinidad and Malta.)

Cotton Goods Manufacture.

United Kingdom	55,653,000 spindles.
United States	31,505,000
Germany	11,186,000
Russia	9,213,000
France	7,400,000
India	6,084,000
Austria-Hungary	4,909,000
Italy	4,600,000
Japan	2,300,000

Wool.

The most marked feature of the production of wool is that the sources of supply are very extensive and varied. Wool can be produced in nearly every country. Our supplies are very largely obtained from our own colonies, which is clearly a very favourable feature in the case of such an important article of commerce.

London, until comparatively recently, was the market for European and home buyers. Several of the large Yorkshire firms and a number of European manufacturers now, however, buy at the sources of supply.

Wool production and sheep rearing are, of course, intimately connected industries. Sheep are fitted for light soils and for hills, and do particularly well on poor lands not suited for cattle. The upland dry pasture of our own country, it may be noted, has long been the home of several well-known breeds, *e.g.*, *Cotswolds*, *North* and *South Downs*, and the *Cheviots*.

In the process of manufacture the raw wool is first thoroughly cleansed. The fibres are then carefully separated and combined to form yarn, which is used by the spinners in the construction of woollen fabrics.

The *merino sheep* is the principal variety in *Australasia*, and supplies fine clothing wool; it is, however, poor as mutton. By crossing with several well-known British breeds, the weight of the carcass has been increased without seriously affecting the quality or yield of the wool.

The *Cotswolds* and the *Lincolns* are important long-woolled breeds; the *Leicesters* and *Shropshires* are medium-woolled.

Australasia, with her magnificent pasture-land (*Downs of Australia* and *Canterbury Plains of New Zealand*), is well to the front in wool production, Britain receiving practically all her supplies.

The *Pampas* of the *River Plate* afford excellent pasture for sheep, and have also within recent years given rise to a great cattle-rearing industry. The remarkable increase in output during the last decade points to a serious rival to our Australasian colonies.

The *Karoos* of *South Africa* have been increasing in importance, and promise to take a prominent place in future supplies.

Wool Export.

Australia	621,087,000 lbs.
New Zealand	188,362,000 "
British South Africa	161,975,000 "
India	53,427,000 "

Sheep—British Empire.

Australia	83,245,000
New Zealand	23,750,000
India	22,848,000
Cape Colony	17,135,000
Orange River Colony	8,588,000
East Africa	6,500,000
Transvaal Colony	3,415,000
Canada	2,474,000
Basutoland	1,369,000

Silk.

The silkworm and the mulberry are both indigenous to *China*. Silk, therefore, originally came to Europe from that country. From China the art of silk culture and manufacture gradually spread westwards through *India*, *Greece*, *Italy*, *France*, *Spain*, and ultimately to *Britain*. Our climate, however, is not suited to the growth of the mulberry or the rearing of the silkworm, and the attempt was abandoned.

In the course of manufacture dyeing is a very important operation. Before that process the raw silk has to be boiled in a

strong solution of fine white soap to extract the natural gum.

The high price and the beauty of silk goods have led to many attempts at imitation. *Ramie fibre* is often used, and *mercerised cotton* has been successfully used to imitate silk. *China, Japan, and Italy* practically monopolise the silk production of the world.

Silk Production.

Japan	10,620,000 kgs.
China	8,655,000 „
Italy	4,105,000 „
Turkey	1,205,000 „
France	505,000 „

Raw Silk Export.

Japan	£18,888,000
Italy	15,854,000
China	14,277,000
France	6,470,000
India	285,000

Flax.

Flax has a very wide range of cultivation. It is grown in tropical and subtropical parts for seed production, and in cool temperate parts when the fibre is needed.

The seed (*linseed*) is of importance for the extraction of its oil, which is used in *paint* manufacture and for *oil-cake*, while the fibre is the basis of the *linen* industry.

The best fibre is produced in *Belgium*, but *Russia* has the largest output. *India* and the *United States* produce the largest quantities of *linseed*.

When the fibre is required, the flax plant is steeped in water to cause the soft parts to rot. It is then beaten to break up the hard parts and leave the long fibres ready for use.

New Zealand flax, or *phormium*, is a special variety of flax indigenous to New Zealand.

Flax Export.

Russia	£8,695,000
Belgium	5,311,000

Argentine exported 893,000 tons.

Linseed Production.

India	536,000 tons
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Linseed Export.

India	£8,274,000
Argentine	3,568,000

Hemp.

Hemp, like flax, has a wide range of cultivation, being grown in tropical and

temperate parts of the world. It is now produced to some extent in nearly every country, and is found as near the Equator as *India* and as far north as *Archangel* in *Russia*.

The plant is chiefly grown for its fibre. The fibre is obtained from the plant in much the same way as that employed in the case of flax. It is used for the manufacture of *cordage*, *sailcloth*, *caulking material*, and *sacking*.

The *Philippine Islands* produce a special variety of hemp in large quantities, known as *Manilla hemp*. It is obtained from a species of wild plantain, and is of very fine quality.

Manilla hemp is used for the production of fine ropes and *cordage*.

Hashish, an intoxicating drug, is prepared from *Indian hemp*.

Henequen (*sisal hemp*) is produced in *Yucatan*. Like other varieties it is used in the manufacture of *sacking* and *cordage*.

Hempseed is largely used as food for poultry and birds.

Export of Hemp.

Philippine Islands	£4,611,000
Italy	2,322,000
Russia	2,026,000

Export of Sisal.

Mexico	£3,013,000
German East Africa	210,000
Bahamas	66,000

Jute.

Jute is a tropical product, and is principally grown in *India* in the *Ganges Valley*, where the rich soil, high temperature, and heavy rainfall are favourable for its cultivation. It is largely used for the manufacture of *sacking*. The finer fibres mixed with other fibres are now used in the manufacture of *carpets*, *plush*, and *velvet*.

Dundee is the chief centre for the production of jute fabrics.

Jute bags, or "Gunny bags," are largely manufactured in *India*, and exported to various parts of the world.

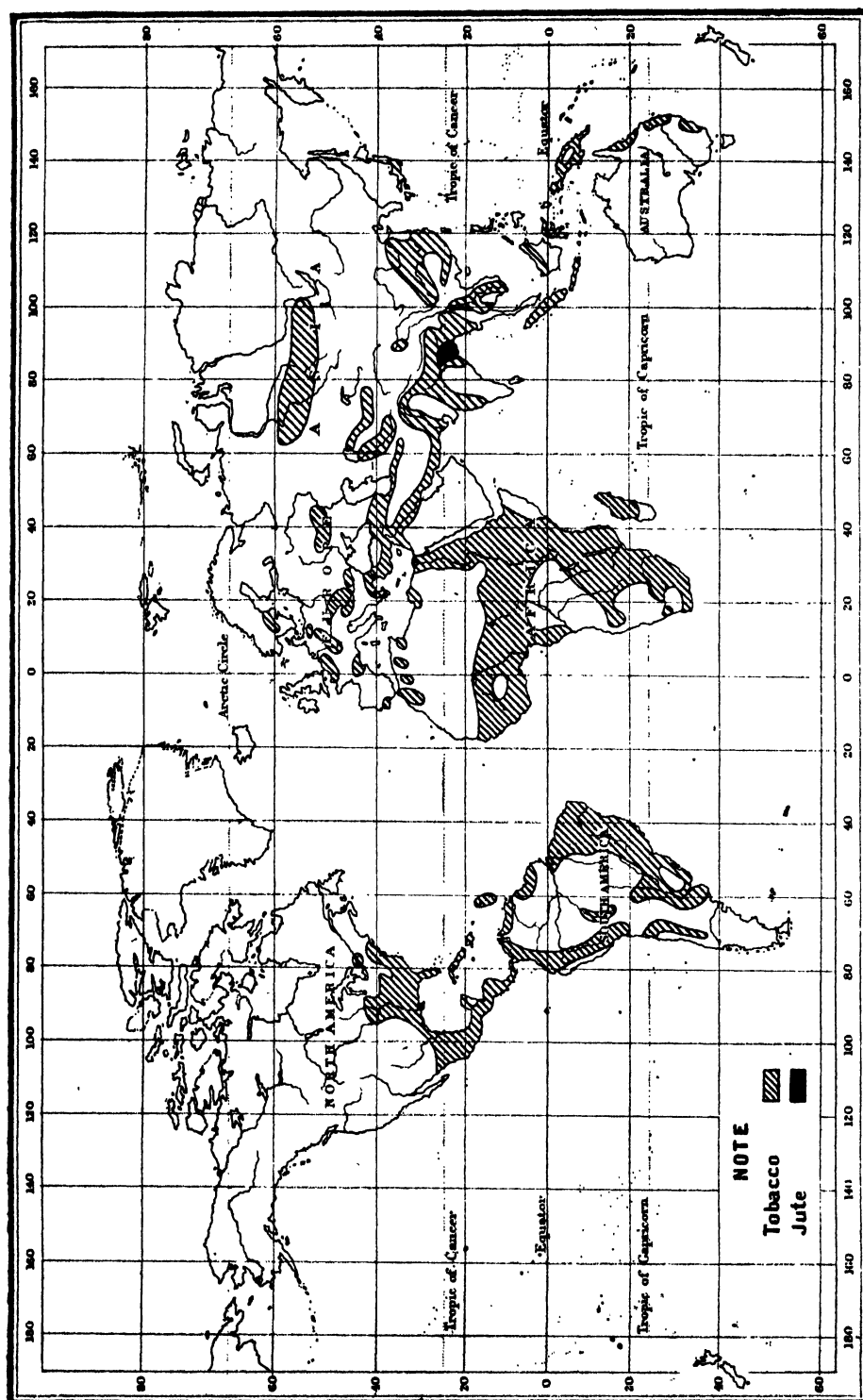
Jute Production.

India	9,522,000 bales
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Jute Export.

India	£18,235,000
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Map 14.



DISTRIBUTION OF TOBACCO AND JUTE.

Mohair.

Mohair is the fine silky hair of the *Angora goat*, which is native to *Asia Minor*. *Cape Colony* has in recent years taken an important place in the production of mohair.

The so-called *Cashmere wool* is the hair of the *Cashmere goat*.

Export of Mohair.

Cape Colony	£877,000
Asiatic Turkey	637,000

Alpaca and Vicuna Wool.

Alpaca is the wool of the *Alpaca llama*, which is native to *South America*.

Vicuna wool comes from another species of *llama*, which is also native to *South America*.

Camel's Hair.

Camel's hair is largely used in the *East* for the manufacture of *carpets* and *shawls*.

Esparto Grass.

Esparto grass, or *alfa*, is grown in *Spain* and *Algeria*. It is used in Britain for *paper-making*, and in *Spain* for the manufacture of *matting*.

Export of Esparto Grass.

Spain	£189,000
Tunis	168,000

China Grass.

China grass, or *ramie*, is grown in *South-Eastern Asia*, and is used for the manufacture of *cordage*. *Ramie fibre* is one of the strongest of textile materials. It is of great economic importance.

Aloes.

Aloes are produced in certain tropical and subtropical countries, particularly in the *Barbadoes*, *Mauritius*, and *Cape Colony*. The fibrous parts of the plants are utilised in the manufacture of *cordage*, and certain of the juices have *medicinal properties*.

Export of Aloe Fibre.

Mauritius	£46,000
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Dyes.

Madder has been largely used to produce the fine "Turkey-red" dye, but it is now almost superseded by a coal-tar colour. It is produced in *Southern Asia*.

Cochineal is an insect. It gives a red dye,

and is obtained on the cactus in *Central America*.

Camwood and *barwood* are largely used in wool-dyeing. They are obtained in *West Africa*.

Quercitron bark is used by wool dyers for orange and yellow colours.

Logwood is used to obtain black and dark blue colours, and is employed by silk, wool, and cotton dyers. It is also used in ink manufacture.

Indigo is a very important dyeing substance and is used to obtain a fine permanent blue. It is produced very largely in the *Ganges Valley* in *India*.

Fustic, obtained in *Central America*, gives a yellow dye.

The *aniline dyes*, obtained from coal tar and benzine, have largely superseded animal and vegetable dyes.

Arnatto is a reddish colouring matter which is extracted from certain plants grown in the *East Indies*, *British Guiana*, and *Central America*.

EXERCISES.

1. What do you understand by the term "textile materials"?
2. Name the chief textile products exported by India.
3. What are the climatic conditions necessary for the cultivation of cotton? What is meant by "long and short staple" cotton? Name the chief cotton exporting countries of the world.
4. Into which of the British ports would flax, jute, cotton, wool, and hemp be chiefly imported? Discuss the convenience of the ports for the districts of manufacture.
5. Write a short account of the cotton trade and cotton manufacture of Great Britain.
6. What are the chief countries of the world for the production of raw silk? On what does the production of silk depend?
7. Say what you can of the production of flax and hemp.
8. What are each of the following: mohair, alpaca, linseed, vicuna, sisal? Give the area in which each is mainly produced.
9. Name the chief animal, vegetable, and mineral dyes, and state their important uses.

Forest Products.**Timber.**

Timber is obtained from the great temperate and tropical forests of the world.

The *temperate forests* lie in a great belt

south of the tundra in the Northern Hemisphere, and are found at their best in *Canada*, the *United States*, *Scandinavia*, *Russia*, and *Siberia*. They are easily divided into two areas—the *coniferous* and the *deciduous*. The *coniferous*, or more northerly area, yields soft timber, such as *pin*es, *firs*, and *spruces*. The trees of this forest are tall and straight, and are admirably suited for masts and other purposes where great strength is needed with a small girth. Being soft, the wood is easily worked, and is in great demand for *joinery* and *building work*. Owing to the great extent of the forest the lumbering industry is at present limited to areas suitable for easy water transport. The logging is carried on in the winter months, and the logs are hauled over the smooth frozen ground to the banks of the nearest stream. In spring, when the rivers are in flood, rafts are floated to the milling centres. The lumbering industry is seen at its best in *North America*.

The *deciduous*, or southern area of the temperate forest, yields a hard timber, which is valuable in *furniture-making*. Characteristic trees of this area are the *walnut*, *oak*, *chestnut*, *maple*, *beech*, *elm*, and *hickory*. The *cork oak* is found in *Spain* and *Portugal*, and is specially valuable owing to the great wine industry in those countries.

In the temperate forests of the Southern Hemisphere several very important trees are found. In *Australia* the *Eucalypti*, or *gums*, are conspicuous, the chief being the *blue gum*, *jarra*, and *karri*. The *blue gum* is found principally in the south-east and the *jarra* and *karri* in the south-west of the continent. *Jarra* is very hard and durable, and is largely used in street paving. In *New Zealand* *kauri pine* is the chief timber.

Tropical forests are found in the *Amazon basin*, *Congo basin*, *Further India*, and *Malay Peninsula*. They are characterised by great variety and density, and yield a very beautiful valuable timber. The chief trees are *ebony*, *mahogany*, *rubber*, *rosewood*, *teak*, *cinchona*, and *bamboo*. *Ebony* is found in *Ceylon*, *India*, and *Madagascar*; *teak* in *India* and *Further India*; *mahogany* in the *West Indies* and *Central America*; *rosewood* in *Brazil*; *cinchona* on the slopes of the equatorial *Andes*; and the *bamboo* in *South-Eastern Asia*. *Teak* is of special value. It is of a brown colour, and has a characteristic odour due to the presence of an oil which

repels insect attacks. The oil also prevents the rusting of iron embedded in it. It has been largely used on warships, since it does not splinter when broken. In the cutting down of teak forests elephants are used to drag the logs to the waterways.

Since the forests of the world are so widely distributed, most countries are self-supporting as regards timber. *Great Britain*, *Belgium*, *Spain*, *Italy*, and *France* are the chief importing countries, while *Russia*, *Canada*, *United States*, *Scandinavia*, and *Australia* are the chief exporters.

Export of Timber.

United States	£23,145,000
Russia	16,361,000
Sweden	16,258,000
Canada	9,247,000
Finland	7,000,000
Rumania	1,030,000
Australia	890,000
India (teak)	814,000
Siam (teak)	421,000
British Honduras (mahogany and logwood)	227,000
Jamaica (logwood)	176,000
Haiti (logwood)	about 300,000 tons
Nicaragua (mahogany and cedar)	£36,000

Export of Wood Pulp.

Canada	£1,102,000
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Forest Products (other than Timber).

Rubber.—Rubber is the coagulated juice or sap of certain creepers and trees of parts of the tropical forest. It is chiefly produced in *Brazil* and *Belgian Congo*, but is also obtained in most tropical areas. Owing to the great increase in motor traction and the use of electricity for lighting and power there is a great demand for rubber, and its production has been greatly increased in recent years.

Gutta-percha.—Gutta-percha is also the coagulated sap of a tropical tree. It is chiefly obtained from the *Malay Archipelago*, and is in great demand for *insulating submarine cables*. For its production trees are felled, while in the case of rubber it is only necessary to make an incision in the trees.

Quinine.—Quinine is obtained from the cinchona of *South America*, *India*, and *Ceylon*. Its *medicinal properties* are very great.

Tar.—Tar is obtained from the pines and firs of the coniferous forest.

Turpentine.—Turpentine is obtained by tapping the trees of the coniferous forest. It is largely used in *paint* manufacture. The *United States* has a large export.

Resin.—Resin occurs in combination with turpentine in pines and firs. It is obtained by distilling crude turpentine.

Mastic.—Mastic is obtained from the Mediterranean area, and is used in *varnish* manufacture.

Gum Arabic.—Gum arabic is obtained from Arabia and Central Africa. It is used to *stiffen calico* before colours are applied.

Eucalyptus.—The oil of eucalyptus is obtained from the blue gum. It has important *medicinal properties*.

Sarsaparilla.—Sarsaparilla is obtained mainly from *tropical America*.

Kauri Gum.—Kauri gum is obtained from the old forest areas of *North Island, New Zealand*. It is the exuded sap of the trees of bygone ages. It is largely used in *varnish* manufacture. Export, £396,000.

Castor Oil.—Castor oil is extracted from the seeds of the castor oil plant. It is exported chiefly from *Calcutta*.

Ipecacuanha.—Ipecacuanha is extracted from the roots of a plant found in *tropical America*.

Nux Vomica.—Nux vomica, from which *strychnine* is obtained, is obtained from the seeds of a plant grown in the *East Indies*.

Cork.

Cork is the bark of the cork oak, which flourishes in the *south of Europe*. Its chief value is in its ability to resist water and its comparatively small weight.

Bast.

Bast is obtained from the lime tree, and is used in *mat making*. Large quantities are obtained from *Russia*, the chief port of export being *Archangel*.

Rubber Export.

Brazil	£10,237,000
Federated Malay States	7,425,000
Ceylon	3,817,000
Belgian Congo	2,124,000
Bolivia	1,241,000
Venezuela	501,000
Peru	500,000
Gold Coast	169,000
Colombia	144,000
Ecuador	140,000

(Exported also from Guatemala, Br. Guiana, Nyasaland, Borneo, and Costa Rica.)

Bamboo.

Bamboos flourish in tropical countries, especially the *monsoon lands of Asia*. They have light hollow stems which are largely used in parts of Asia for *furniture* and *building purposes*.

Palms.

Palms are characteristic tropical trees, and are often of great beauty. They are of very great use to the natives of tropical lands, and civilised man is indebted to them for *sago*, *dates*, *coco-nuts*, *palm oil*, and various *resins*.

Sago Palm.

The sago palm is easily cultivated and has a very large yield. The edible part is obtained from the pith of the tree. The palms are cut down and the trees peeled. The pith is then extracted, powdered, and mixed with water. It is then drained and leaves crude sago. On account of the ease with which this food is prepared the natives give very little attention to agriculture. Large quantities of sago are obtained from the *Straits Settlements*.

The Oil Palm.

This palm requires great heat and moisture and is seldom found very far from the sea coast. It is found in very large quantities in *Africa* near the *shores of the Gulf of Guinea*, and in *Zanzibar*. The oil is obtained from the soft part of the fruit. It is largely used in the manufacture of *soap* and in the *tin-plate industry*.

Palm Oil Export.

Southern Nigeria	£1,748,000
Belgian Congo	800,000
Gold Coast	113,000
Sierra Leone	67,000

(Also exported from most of the other parts of Tropical West Africa.)

Palm Kernels Export.

Southern Nigeria	£3,051,000
Sierra Leone	793,000
Gold Coast	205,000
Belgian Congo	186,000
Northern Nigeria	66,000
Gambia	7,000

Export of Palm Produce from Southern Nigeria,
£4,271,000.

Coco-nut Palm.

The coco-nut palm is of very great use to the natives in the tropical lands in which it grows, and also to civilised people. The natives utilise practically every part of the tree, obtaining from it *food* and *drink*, also material for *drinking vessels*, *mats*, *houses*, and *boats*. They also prepare an intoxicating drink called *arrack* from the flower of the tree. Civilised people obtain *fibre*, *fruit*, *oil*, *copra*, and *desiccated coco-nut* from the palm.

Coir fibre is obtained from the husk of the coco-nut, and is largely imported into Britain from *India* and *Ceylon*.

Copra is the dried kernel of the coco-nut and is utilised for its oil. It is an important export from the *islands of the South Pacific*.

Coco-nut oil is best obtained from sun-dried copra. It is largely used in the manufacture of *soap*. *Ceylon* has a large output of this product.

Desiccated coco nut is obtained by shredding the kernel, and is largely used in *confectionery*.

The coco-nut palm is purely a tropical plant and grows best near the sea. It is widely cultivated in *Ceylon*, the *South Pacific Islands*, the *Philippine Islands*, and *South India*.

Cuba exports about 3,000,000 coco-nuts annually.

Export of Copra.

Philippines	£2,300,000
Kaiser Wilhelm Land	2,256,000
Straits Settlements	1,716,000
Ceylon	672,000
Fiji Islands	242,000
Tonga	210,000
Federated Malay States	152,000

(Also exported from Solomon Is., Seychelles, Jamaica, East Africa, Tonga, and Honduras.)

Export of Coco-nut Oil.

Ceylon	£706,000
Mauritius	3,000

*Export of Coir from Ceylon, £204,000.**Ivory Nut Palm.*

This palm is the source of vegetable ivory. The ivory nuts are largely obtained from *Peru*.

Betel Nut Palm.

This grows in the *Malay Peninsula* and yields a small, hard nut which the natives chew.

Date Palm.

Next to the coco-nut the date is the most useful of palms. The stem often reaches a height of 60 feet, is without branches, and is crowned on the summit by a mass of large feather-shaped leaves. The fruit is the staple food of the Arabs who cross the deserts, and the palm is a characteristic feature of *Palestine*, *Arabia*, *Persia*, and *North Africa*. In these countries the date forms an important article of food.

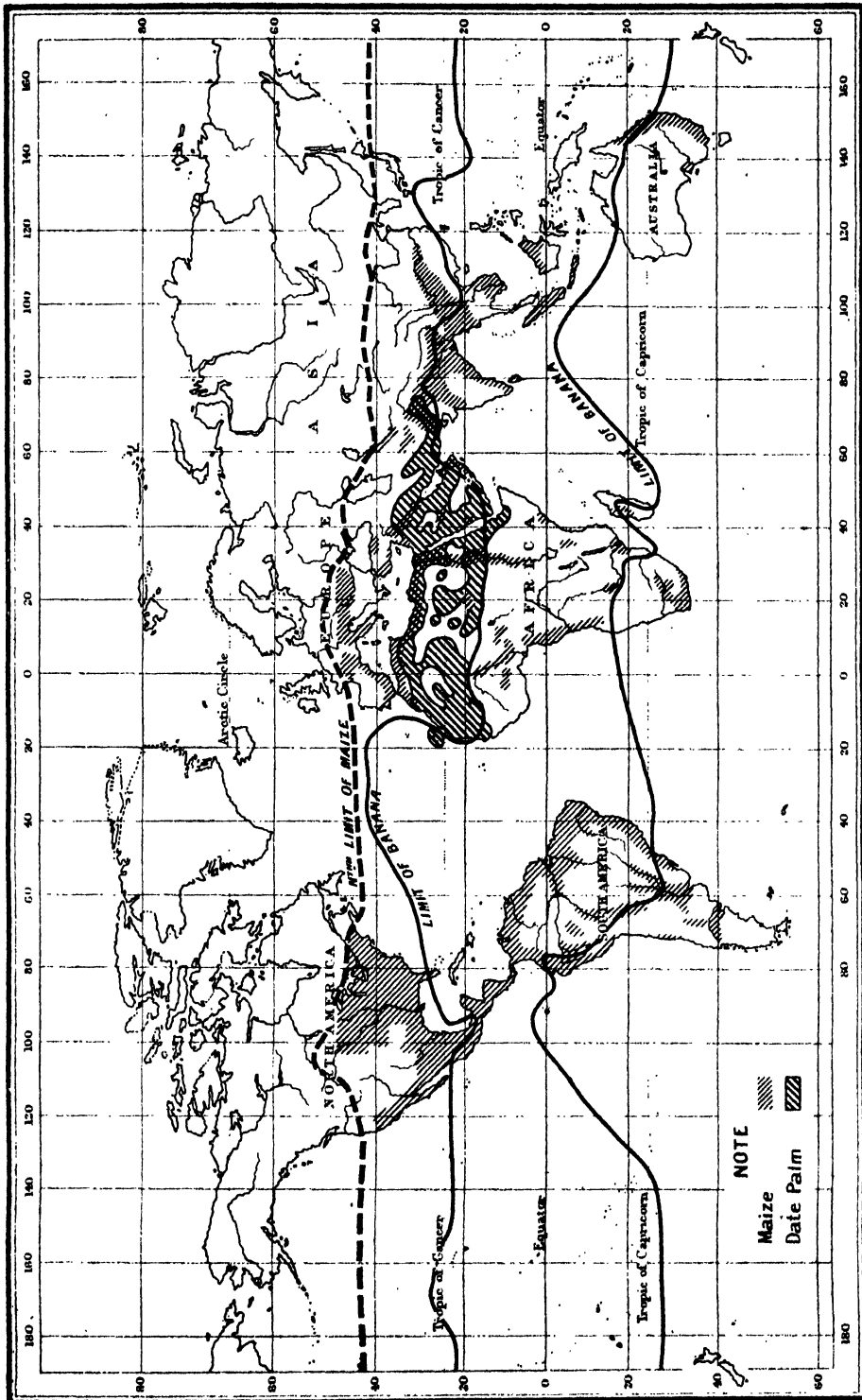
The date palm yields large bunches of fruit which often weigh as much as 30 lbs. An intoxicating drink is often made from dates by fermentation.

Export of other Tropical Produce.

Areca Nuts	Ceylon	£188,000
Arrowroot	St. Vincent	49,000
Balata Gum	Trinidad	312,000
"	British Guiana	102,000
Camphor	Formosa	441,000
"	Japan	224,000
Chillies	Nyasaland	3,000
"	Uganda	13,000
Cocaine	Peru	89,000
Gambia	Straits Settlements	521,000
Ginger	Sierra Leone	52,000
Ground Nuts	Gambia	502,000
Gum Arabic	West Africa	510,000
Gums	Straits Settlements	3,680,000
Indigo	India	150,000
Ivory Nuts	Ecuador	422,000
Kola Nuts	Gold Coast	134,000
"	Sierra Leone	277,000
Mace	Grenada	15,000
Manioc	Madagascar	24,000
Nutmegs	Grenada	22,000
Oil Seeds	India	15,210,000
"	East Africa	186,000
Opium	India	7,432,000
"	Persia	630,000
"	Federated Malay States	355,000
Pea Nuts	West Africa	1,700,000
Pepper	Siam	66,000
Rattans	Straits Settlements	494,000
Tapioca and Sago	Straits Settlements	1,149,000
Vanilla	Seychelles	10,000

EXERCISES.

1. Point out the chief difference between temperate and tropical timber.
2. What do you understand by each of the following: (a) lumber, (b) wood pulp, (c) conifers?
3. Write a short account of the lumbering industry in Canada.
4. State the chief products other than timber of (1) the temperate forest, (2) the tropical forest.



DISTRIBUTION OF MAIZE, DATE PALM, AND BANANA.

5. Name the chief palm trees of the world and the important commercial products derived from them.
6. What are (a) coir, (b) ground nuts, (c) palm oil, (d) copra?

Other Vegetable and Animal Products.

Tobacco.

Tobacco is very widely cultivated, being grown in tropical and temperate countries. It cannot be grown successfully, however, in countries which have severe frosts.

Differences of quality and characteristics of tobacco are due to differences in soils and climate in the areas of production.

The most famous tobacco-growing area in the world is in the north-west corner of the *Isle of Cuba*, round *Havana*. Choice cigars are a speciality of that area. Real Havana cigars are costly.

The largest area for tobacco production is in the *United States*, on the eastern side, between latitudes 35° N. and 40° N. *Richmond*, in that area, is one of the largest tobacco markets in the world. *Turkish* tobacco is light and mild, and is largely used in the manufacture of cigarettes. The *East Indies* produce tobacco of good quality, which, like that from the *West Indies*, is mostly made into cigars (Manillas).

Latakia is a finely flavoured tobacco mainly used in blends.

Snuff is finely powdered tobacco, and is made chiefly from the stems.

Tobacco Export.

United States	£11,036 000
Cuba	6,261,000
Dutch East Indies	5,608,000
Turkey	1,694,000
Brazil	1,637,000
Porto Rico	625,000
Philippines	415,000

Cigar Manufacture.

Philippines	207,396,000 (Manillas)
Cuba	188,139,000
Porto Rico	285,000,000

Waxes.

Japan wax is a vegetable wax yielded from certain trees grown in *Japan*. It is used in the manufacture of *candles*.

Chinese wax is an insect product.

Spermaceti is a hard wax found in the head of the sperm whale.

Paraffin wax. (See Petroleum.)

Export paraffin wax from United States, £1,621,000 annually.

Ozokerite is a wax found in *Galicia*. It is largely used in *candle-making*.

Sealing wax is mainly prepared from resins. It is not so much used now as formerly.

Beeswax is secreted by bees to form the honeycomb. It is often adulterated with other waxes.

Waxes are used in the manufacture of *candles*, *furniture polishes*, *ointments*, and in the *finishing of certain fabrics*.

Ambergris.

Ambergris is a substance obtained from the intestines of the sperm whale. It is used as a *perfume*.

Oils.

The oils of commerce are of three kinds—animal, vegetable, and mineral.

The chief *mineral oil* is *petroleum*. (See Minerals.)

Animal oils are mainly derived from the whale, seal, and cod-fish.

Spermaceti, or whale oil, is largely used in the manufacture of *candles*.

Cod liver oil is exported largely from the great cod-fishing centres of *Norway* and *Newfoundland*. It is an important *medicine*.

The chief *vegetable oils* are *castor oil*, *oil of turpentine*, *linseed*, *rape seed*, *cotton seed*, and *palm oils*. (See other sections.)

Attar of Roses.

Attar of roses is distilled from the petals of the damask rose. The damask rose is grown on a large scale in *Bulgaria*, particularly round *Kazanlik*. In the centre of the southern half of *Bulgaria* is the well-known "*Valley of Roses*." *Turkey* and *Persia* are the other important areas for the production of attar of roses.

Rose wa.e.r is a diluted form of attar of roses. *Export from Bulgaria*, £465,000; *Persia*, £236,000.

Liquorice.

Liquorice is the name given to certain herbs grown in *South Europe* (especially *Spain*) *South Asia* (especially *Turkey*), and *North Africa*. Liquorice juice is extracted from the roots of the plants.

Another variety is obtained from *India*.

Lacquer Tree.

The lacquer tree is grown in *Japan* and *China*. Its sap yields a varnish which is almost imperishable.

Hides and Skins.

Hides and skins are very important commodities, since the leather industry is a very large one. Europe imports raw hides from *Australia*, *New Zealand*, *South America*, *Cape Colony*, and *North Africa*. The United States imports large quantities of hides for the leather industry, notwithstanding her own great production. Goat-skins are chiefly obtained from *Cape Colony*, *Asia Minor*, and *North Africa*. (See also under *Leather*.)

Export of Hides.

India . . .	£10,826,000
Australia . .	4,290,000
Italy . . .	2,513,000
Uruguay . . .	2,347,000
South Africa .	2,018,000
Canada . . .	1,421,000
China . . .	1,388,000
Mexico . . .	1,117,000
New Zealand .	1,085,000

Leather.

Leather is prepared from the skins and hides of various animals. The larger animals are generally selected, but the skins of most animals can be utilised. The hides of the *calf*, *ox*, *sheep*, *kid*, *goat*, and *pig* are the chief used for the manufacture of leather.

The grass-lands of the world are so extensive, and the consumption of flesh food so great, that the supply of hides is enormous and the sources of supply very widespread. *North* and *South America*, *Cape Colony*, *Australia*, and *North Africa* are the chief centres for supplies. *Goat-skins* are mainly obtained from *Asia Minor*, *North Africa*, and *Cape Colony*.

Tanning is the process employed to render the hides durable. The chief tanning materials used are *oak bark*, *hemlock bark*, *willow bark*, and *black wattle*.

Russian leather was originally a speciality of *Russia*, but is now produced in many European countries. It is tanned with willow bark, and afterwards treated with oil obtained from the birch tree. The oil gives it its peculiar smell. The leather is very strong and resists insect attack.

Morocco leather was originally a product of Mediterranean countries. It is prepared from goat-skins, tanned with sumach, and is usually dyed.

Roan leather is prepared from sheep-skins, tanned with sumach and finished with a smooth surface.

Glove kid is prepared from the skins of young kids. It is prepared chiefly in *France*.

Chamois leather is prepared by impregnating hides with oil.

Leather cloth is made by preparing calico with a thick paste and coating it with boiled oil.

Export of Leather.

United States	£12,758,000
France . . .	3,127,000
India . . .	3,020,000
Australia . .	648,000
Canada . . .	360,000

Horns.

Horns are obtained from *oxen*, *sheep*, *goats*, and *antelopes*. They differ from antlers in not being shed annually, but being permanent.

Horns are used for the manufacture of *combs*, etc., and are exported from *South America*, *Australia*, *Cape Colony*, *India*, *Russia*, and the *United States*.

Feathers.

Feathers are obtained from birds, and consist essentially of a strong, partially hollow stem and a web of regularly arranged fibres. They form a valuable article of commerce, particularly those obtained from the *ostrich*, *swan*, *peacock*, and *goose*. Their chief use is for plumes and as ornaments.

Eider down is obtained from the *eider duck* which is found in high latitudes of the temperate zone. Owing to its lightness and warmth the down is of great use in the manufacture of *beds* and *coverlets*.

Export of ostrich feathers from South Africa, about £2,954,000 annually.

Furs.

Furs are obtained from the cold regions of the world, where nature has provided the animals with very warm coats. The northern parts of *Siberia*, *Canada*, and *European Russia* are the chief sources of the best and most valuable furs.

Fur is used for *dress*, and also for the manufacture of *felt*.

Ermine, the winter coat of the stoat, is one of the most costly furs. The *chinchilla*,

mink, marten, sable, skunk, musk rat, squirrel, sea otter, and seal are all highly valued. Other fur-bearing animals are the *badger, beaver, otter, lynx, wolf, cat, opossum, and rabbit*. *Monkey skins* and the *skins of lions and tigers* are obtained from tropical parts of the world. *Australia* exports large quantities of *rabbit skins*, since in that country the rabbit has become quite a plague. The *seal fisheries* of the *Pribilof Islands* in the *Behring Sea* are the chief source of *fur seal*.

The chief fur markets of the world are *London, Leipzig, and Nijni Novgorod*.

Export of Furs.

Russia (with leather)	£5,240,000
United States . . .	3,620,000
Canada	1,040,000

Ivory.

Ivory is the hard substance forming the tusks of *elephants*. The same name is often given to a similar substance obtained from the *hippopotamus* and the *walrus*.

The best elephant ivory is obtained from the *Congo Free State* in *Africa*, and *Antwerp* is the chief market for the product. The tusks often exceed 50 lbs. in weight, and are then of exceptional value.

Ivory is of great value for *carving*, and for the manufacture of *ornaments, instruments, and billiard balls*.

Mammoth ivory, obtained in *Northern Siberia*, is of little value.

(See also Vegetable Ivory.)

Ivory Export.

Belgian Congo . . .	£490,000
Zanzibar	45,000
German East Africa .	40,000

Ivory Nuts.

Solomon Isles . . .	£20,000
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EXERCISES.

1. Name the most important tobacco-producing areas of the world, and state the chief difference in the products in the different areas.
2. Which of the tobacco areas specialise in (1) cigars, (2) pipe tobacco, (3) cigarette tobacco?
3. What are the chief animal products other than meat and fibre? State their uses in the manufacturing world and the areas from which they are derived.

4. Write a short account of the leather industry, mentioning the sources of the raw material and the materials used in tanning.

Marine Products.

Fish.

Fish enters largely into commerce in the *fresh state, cured, salted, or tinned*.

Fresh fish, owing to its perishable nature, had at one time to be sold quickly at the markets, but a large amount of waste is now prevented by refrigeration and other good methods of storage.

The chief sea fisheries of the world are centred on the banks of the *North Sea* (*Dogger and Wells banks*), and on the banks off the coasts of *Newfoundland* and *Nova Scotia* (*Grand, Western, and George's banks*). The largest *river fisheries* are in the *west of North America* in the *Columbia, Fraser, Stikkeen, and Skeena*.

Notwithstanding the abundance of fish round the British coasts Britain imports very large quantities, principally from *North America, Norway, and France*. *Newfoundland, Canada, and Norway* export large quantities of salted cod to the Roman Catholic countries of Europe. *British Columbia* exports *tinned salmon* to all parts of the world, and *Britain* has a large export of *preserved herrings*. *Sardines*, preserved in oil, are mainly exported from *South France*, but the *United States* has now developed a sardine industry.

London has the largest fish market in the world at *Billingsgate*, but *Gloucester* in the *United States* and *Bergen* in *Norway* have also a large trade in fish.

Oysters.

Oysters are recognised as a valuable human food. They are cultivated best in the warm waters of shallow estuaries of the temperate zone.

English oysters are highly valued, the chief beds being at *Whitstable* in *Kent*. Other English oyster beds are found at *Colchester* (Brightlingsea). In France oysters are cultivated at *Marennes* and near *Rochelle*. It is said that the best and largest oysters are to be found in parts of the Atlantic seaboard of the United States. The *Chesapeake Bay* and *Long Island Sound* beds are the most important and largest sources of

supply, and have a larger output than any other area of the world.

Sponges.

Sponges, as known in commerce, are the frameworks of organisms which inhabit the water of certain parts of the ocean. They are very widely distributed, but are mainly obtained from the waters of the *Levant* and the *Adriatic*, and off the coasts of *Florida* and the *Bahamas*. *Bath sponges* also occur in the *Red Sea* and in *Australian waters*.

Sponges are generally obtained by divers, but in shallow waters they are obtained by the use of long forks.

Sponge Export.

Bahamas	£172,000
Greece	100,000
Caicos Is.	1,500

Bêche-de-Mer.

Bêche-de-mer, or *tre pang*, is a sea slug whose dried flesh is much valued as an article of food in *China*. The animals are obtained off the coasts of *North Australia* and the *East Indies*. They are chiefly used by the Chinese in soups.

Coral.

Coral consists mainly of calcium carbonate. That of commerce is the production of various polyps. The red and pink varieties are most highly prized. The coral fishery is carried on in parts of the *Mediterranean Sea*, mainly off the coasts of *Italy*, *Algeria*, and *Tunis*. *Italy* takes an important part both in coral fishing and in the preparation of the substance for the market.

Coral polishing and preparation is an important industry at *Leghorn*, *Genoa*, and *Naples*.

Isinglass.

Isinglass is a form of gelatine prepared from the bladders of various fish. The finest is prepared in *Russia* from the *sturgeon*. It is used in *cooking* and in the *brewing* industry, and is exported from *America*.

Pearls.

Pearl is the name given to a substance found within the shells of certain molluscs. It is highly valued, and ranks with the gems.

The best known pearl fisheries are in the *Gulf of Manaar* near *Ceylon*, in the

Persian Gulf, and off the north-west coast of *Australia* near the town of *Broome*. Inferior pearls are obtained near *Panama* and off the coast of *California*.

Artificial pearls are now manufactured in parts of *Europe*.

Mother-of-pearl is obtained from certain kinds of shells. It is largely used in *inlaid work* and the manufacture of *ornaments*.

Pearl Export (and shell).

Bahrein Is.	£899,000
West Australia	527,000
Persia	76,000
Solomon Is.	5,000

EXERCISES.

1. Name the chief fishing grounds of the world, and state the kind of fish caught in each.
2. Where is salmon fishing a very profitable industry?
3. Write a short account of the fishing industry of the Mediterranean Sea.
4. Say what you can of the chief oyster fisheries of the world.
5. What are each of the following: (1) sponge, (2) coral, (3) pearl, (4) tre pang, (5) tunny.

Mineral Products—Industrial Minerals.

Coal.

Coal is mined in its perfect state, and is thus ready for use immediately on its extraction from the ground. It is usually found resting on clay beds, which represent the soil in which the plants grew from which the coal has been formed.

Lignite is the soft brown coal containing about 67 per cent. of carbon. It is not of very great commercial value.

Bituminous coal contains about 85 per cent. of carbon, and is much harder than lignite. It burns readily, and is the chief coal used for *domestic purposes* and *gas manufacture*.

Anthracite is a very hard coal, and contains about 94 per cent. of carbon. It burns slowly but with very great heat. The largest deposits of this coal are found in *Pennsylvania* in the *United States*.

Coal is of very great value both for domestic use and in all industries. For domestic use it is of importance for heating,

and indirectly for lighting purposes. In all industries it is at the present time the chief

tion under great pressure of animal and vegetable matter, and is usually obtained by boring until the oil reservoir is reached. It generally gushes to the surface by the force of its own gaseous pressure. Thousands of miles of pipes carry the crude oil from the wells to the ports and the refineries.

In the process of refining *benzine*, *naphtha*, *gasolene*, and *kerosene* are obtained. *Vaseline*, *paraffin wax*, and *lubricating oils* are produced from the residue after refining by distillation.

The two great uses of petroleum are for *illumination* and as a *liquid fuel*.

The chief sources of the world's supply of the oil are the *United States*, *Russia*, and the *East Indies*.

In the United States it is obtained in the north-eastern states, principally *Pennsylvania*, and in Russia in the *Caucasian area*.

Petroleum Production.

United States . . .	29,615,000 metric tons
Russia . . .	9,318,000 " "
Mexico . . .	2,208,000 " "
Rumania . . .	1,807,000 " "

(Also produced in East Indies, Galicia, India, Peru, Japan, Germany, Canada and Italy.)

Iron.

Iron is very seldom found in the pure state in nature, but chiefly in the form of *oxides* and *carbonates*. The chief oxides mined are *magnetite*, *red hæmatite*, and *brown hæmatite*.

Magnetite is found chiefly in *Sweden* and in the neighbourhood of *Lake Superior* in *North America*. It is black in colour, and is the purest form of iron.

Red hæmatite is found in large quantities in the *Furness District of Cumberland* and in the *Eastern United States*.

Brown Hæmatite is mined largely in *Spain*. The hæmatites are used for the manufacture of the *best steel*.

Iron pyrites, a combination of iron and sulphur, is of more importance for its sulphur than its iron.

Iron ores, of great variety, are very widely distributed over the earth.

Since smelting is necessary in the extraction of pure iron, it follows that coal and iron in close proximity in a country are of very much greater value than either mineral separately. The best possible combination is coal, iron ore and lime-

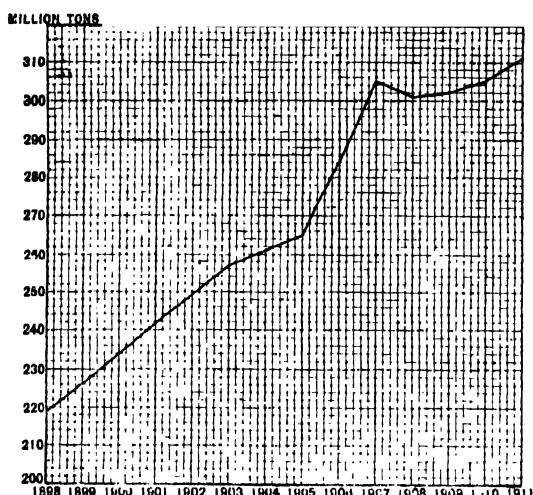


Fig. 9.—Coal Production of the British Empire.

fuel used for steam production. It is also the fuel used in most systems of transport.

Coal Production.

United States . . .	477,202,000 tons
United Kingdom . . .	260,416,000 "
Germany . . .	172,065,000 "
France . . .	39,475,000 "
Russia . . .	25,998,000 "
Belgium . . .	22,603,000 "

Lignite Production.

Germany . . .	79,634,000 tons
Austria . . .	25,861,000 "
Hungary . . .	8,024,000 "

Coal Production (United Kingdom).

Yorkshire . . .	38,298,000 tons
Durham . . .	37,890,000
Glamorgan . . .	33,727,000
Lancashire . . .	22,790,000
Lanarkshire . . .	16,624,000
Derbyshire . . .	16,573,000
Staffordshire . . .	13,698,000
Monmouthshire . . .	13,393,000
Northumberland . . .	13,383,000
Nottinghamshire . . .	11,123,000

Petroleum.

Petroleum is widely distributed in the rocks of many parts of the world. It has probably been produced by the decomposi-

stone, the limestone being used as a flux in smelting.

Pig iron is obtained by smelting iron ore in a blast furnace containing coke and limestone. A hot blast is driven through the mixture.

Cast iron is pig iron which has been run when molten into suitable moulds to give the required shape.

Wrought iron is obtained by driving out most of the carbon from molten pig iron.

Steel is produced when the carbon is burnt out of pig iron by suitable means.

Iron Ore Production.

United States	55,150,000 tons
Germany	32,190,000 „
France	18,744,000 „
United Kingdom	13,790,000 „
Spain	8,633,000 „
Russia	8,054,000 „
Sweden	6,593,000 „

In 1913 the world's output of iron ore was about 152,000,000 tons, the principal producers being as given above. The *United States*, *Germany*, the *United Kingdom*, *France*, and *Spain* produce

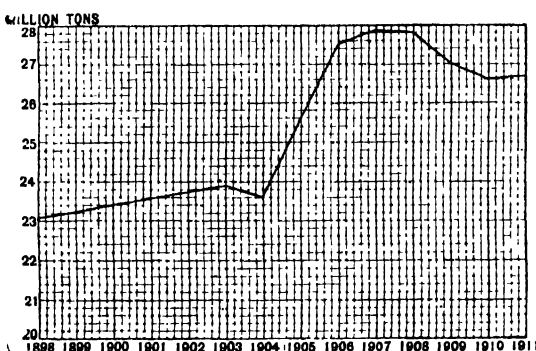


Fig. 10.—Iron Production of British Isles.

about six-sevenths of the world's output. The maximum output of the *United Kingdom* took place in 1882, when it amounted to over 18,000,000 tons. The average in the years 1908-12 was about 15,000,000 tons per annum. It is interesting to note that *Canada*, *Australia*, *Newfoundland*, and *India* are all producing iron; *Newfoundland's* output is over 1,000,000 tons, and that of *India* in 1912 was 580,000 tons.

Spain exports nearly the whole of her iron.

Belgium imports almost the whole of the

iron ore she requires. The *United Kingdom* imports about three-tenths of the quantity needed. About 72,000,000 tons of steel were produced in 1913, the *United States*, *Germany*, and the *United Kingdom* accounting for over 55,000,000 tons.

Number of blast furnaces in United Kingdom 320

Amount of ore smelted . . . 23,712,000 tons

Coal used in smelting . . . 19,218,000 tons

Copper.

Copper occurs native and in the form of *oxides* and *sulphides*. *Copper ore* is a combination of copper and sulphur, and *copper pyrites* is a combination of copper, iron and sulphur. The pure metal is very malleable and ductile, and a very good conductor of heat and electricity. It is very largely used for *electrical* and *engraving purposes*.

Brass consists of an alloy of zinc and copper; *bronze* and *bell metal* are alloys of copper and tin.

In the *United States* the *Keweenaw peninsula* of *Lake Superior* produces pure copper, while *Montana* has rich supplies of copper ore. The *Rio Tinto* copper mines of *South Spain* have acquired great fame. *Australia* is noted for copper, particularly the portion of *South Australia* bordering on *Victoria*.

Copper Production.

United States	£41,028,000
Australia	3,247,000
Canada	2,614,000
Germany	2,500,000
Japan	2,250,000
Peru	1,978,000
Spain	1,310,000
Norway	800,000
South Africa	508,000

Tin.

Tin is found in nature chiefly in the form of an *oxide*. The pure metal is obtained by smelting. It is of great commercial use for coating other metals to prevent them from rusting or corroding. The *tin-plate* so produced is more durable and less expensive than pure tin. It is used for making the *cans* in which meat and fish are enclosed for preservation.

Tin Production.

Federated Malay States . . .	£12,816,000
Bolivia	4,819,000
Australia	1,334,000
China	1,300,000
United Kingdom	1,117,000
Transvaal	368,000

Zinc.

Zinc is found combined with sulphur as *zinc blende*, and also in the form of the *carbonate*.

The pure metal is put to various uses.

When rolled in thin sheets it is used for *roofing purposes*, since it is only very slowly acted upon by the atmosphere. For the same reason it is often used as a coating for iron to prevent rusting. Iron so coated is said to be *galvanised*. Brass is produced when an alloy is made with copper and zinc.

Zinc Production.

United States	£8,924,000
Germany	5,800,000
Belgium	5,360,000
France	1,810,000
New South Wales	1,776,000
Italy	730,000
Spain	256,000
United Kingdom	159,000
Austria	120,000

Lead.

Lead is found combined with sulphur as *galena*, and also as the *carbonate* and *sulphate*. It is a very valuable metal, mainly on account of its softness and the slight effect of air and water on it. Great quantities are used for *gas* and *water pipes*, and for *lining cisterns*. The sheet metal is also very largely used for *roofing purposes*. Its great density has caused it to be greatly used in the manufacture of *bullets*.

Lead Production.

United States	£7,472,000
Germany	2,350,000
Belgium	1,182,000
Spain	1,000,000
United Kingdom	350,000
Austria	299,000
Australia	296,000
Canada	70,000

Graphite (Plumbago).

Graphite is a soft black or grey mineral. It is used as the lead in *black lead pencils*.

On account of its very smooth nature it is often used as a *lubricator*.

Borax.

Borax is a compound of boracic acid and soda. It is found native in *Tuscany*, *California*, *Persia*, *China* and *Tibet*. The chief use is as a *flux* for metals.

Manganese.

Manganese is usually found in the form of an oxide called *pyrolusite*. The pure metal is obtained from the ore by reduction with aluminium powder. *Metallic manganese* resembles iron in appearance and properties. It is used in *steel manufacture* in order to obtain better ductility. Pyrolusite is largely employed in the chemical industry for the manufacture of *bleaching powder*. It is also used in the manufacture of *black enamel*.

The chief countries producing manganese are *India*, *Brazil* and *Russia*.

Manganese Ore Production.

India	750,000 tons
Russia	500,000 „
Brazil	200,000 „
Australia	4000 „

Mercury (Quicksilver).

Mercury is the only metal which is liquid at ordinary temperatures. It is usually found in combination with sulphur, and is then termed *cinnabar*. It is sometimes, however, found in the free state.

The chief use of the metal is in the construction of *barometers* and *thermometers*.

Salts of the metal are of great use as *medicines*.

The chief sources of the supply of mercury are *Spain*, *California*, *Austria*, and *Italy*. The *Almaden mines* in *Spain* are famous.

Mercury Production.

United States	£211,000
Italy	178,000
Spain	129,000
Austria	120,000

Calomel is a compound of mercury and chlorine. It is largely used in *medicine*.

Platinum.

Platinum is a valuable metal, the production of which is practically limited to

the *Ural Mountains*. It is very heavy, malleable, and ductile, and does not melt until a very high temperature is reached. It is very largely used in the manufacture of *chemical apparatus*, since it is not affected by acids, and has a co-efficient of expansion which is the same as that of glass.

Some platinum compounds are useful in *photography*, and others in *X-ray work*.

Platinum Production.

Russia, £1,890,000 ; United States, £10,000.

Aluminium.

Aluminium is obtained from clays, felspar, and the oxides of the metal. Until quite recently great difficulty was experienced in extracting the metal from its compounds, but electrolysis has very much simplified the process. The output has been considerably increased, and the price of the metal greatly reduced, by the modern method of extraction.

Aluminium is a rather soft metal of small specific gravity. It is unaffected by the atmosphere at ordinary temperatures. The strength and lightness of the metal have led to its use for a large number of purposes. It is largely used for *electric conductors*, in *boat-building*, and for *cooking utensils*.

A large part of the world's aluminium is obtained in the *United States*.

Production in United States, £2,400,000.

Antimony.

Antimony seldom occurs free in nature, but chiefly combined with sulphur. It is not acted upon by the atmosphere. This metal possesses the valuable property of expanding on solidifying, and for this reason its alloy, *type metal*, gives clear distinct castings. *Britannia metal* is also an alloy of antimony. Compounds of antimony are much used in *medicine*.

Arsenic.

Arsenic is widely distributed, but is seldom found free. It is usually combined with sulphur or iron. *Salts of arsenic* are used in *dyeing calico* and *colouring wall-papers*, and also in *medicine*.

Bismuth.

Bismuth occurs free and also combined with sulphur and oxygen. It expands on solidification, and its alloys are consequently used in taking sharp casts of

objects. Bismuth is of very great value in *medicine*.

Salt (Sodium Chloride).

Salt is very widely distributed both in the solid form (rock salt) and in solution in water.

Rock salt is generally slightly coloured by impurities. It is obtained from the earth by mining and by solution. In the extraction by solution, water is admitted to the mines, and afterwards pumped to the surface. The liquid is then evaporated, and the salt obtained as a residue. *Rock salt* is obtained in very large quantities in *North Cheshire*, *South Lancashire*, and *Worcestershire*. *Northwich*, *Nantwich*, *Middlewich*, and *Droitwich* are noted towns for salt production. The salt mines of *Wieliczka* in *Galicia* are renowned. The *United States* produces rock salt in several states, and obtains sea salt from lagoons in *California* and *Massachusetts*.

Salt has many very important uses. Its use as a *condiment* is widespread. As a *preservative of foods*, especially *meats*, it is indispensable. It is also used as a *preservative for hides*, and takes an important place in the manufacture of *chemicals* and *glass*.

Salt in large doses acts as an *emetic*, and *salt solutions* often have a beneficial effect when used in the form of baths.

Production for United Kingdom, 2,122,000 tons.

Sulphur.

Sulphur is very widely distributed, both free and combined, with other elements. It is found very largely in volcanic districts, and most of the supply comes from *Italy*, *Sicily*, *Japan*, and the *United States*. In the compound form sulphur is generally associated with iron, lead, zinc, and antimony.

Refined sulphur is known as *brimstone*, and has many uses. The chief uses are for *fumigation* (by the production of sulphur dioxide), for the manufacture of *gun-powder*, *sulphuric acid*, and other chemicals, and as a medicine. It is also used for *vulcanising rubber* and as an *insulator*.

Output of sulphur in Italy, £1,197,000.

Mica.

Mica is a mineral consisting of thin flexible laminae. The layers are easily separated, and are sometimes exceedingly thin. The mineral is also one of the constituents of

granite. It is also found in many sedimentary rocks such as shale.

Its chief use is to take the place of glass in many *lamps* and *stoves*. In some countries it is used for *window-panes*. Large quantities of mica are obtained in *India*.

Mica production in India . . . £284,000
 " " United Kingdom 12,000

Amber.

Amber is the fossil resin of extinct coniferous trees. It is yellowish in colour, brittle, and fairly transparent. A large amount of the so-called amber is artificially prepared. Amber is largely used in the manufacture of *varnish* and *ornaments*.

The principal sources of supply of the real substance are the *shores of the Baltic* and the *Adriatic*.

Asbestos.

Asbestos is a fibrous mineral of a white or grey colour. It is not inflammable, is also a bad conductor of heat, and is consequently largely used for *packing steam pipes* and in the manufacture of *gas stoves*. The chief sources of the supply of the mineral are *Canada* and *South Africa*. Canada has an output of about 113,000 tons of asbestos.

Asbestos Production.

Canada . . . £769,000
 South Africa . . . 170,000

Gypsum.

Gypsum is a mineral known as calcium sulphate. It is found as *alabaster*, *selenite*, and as a *chalky stone*. The last-named variety is very abundant, and, when heated, becomes what is termed *plaster of Paris*.

Gypsum in solution in water is of special use in *brewing*. When the mineral is in a powdered form it is often used as a *manure*.

Production of gypsum in United Kingdom, £111,000.

Kaolin.

Kaolin is chiefly obtained by the weathering of granite. It is largely used in the manufacture of *porcelain* and *pottery*, and also in *paper manufacture*.

The main sources of supply are *Cornwall*, *Saxony*, *Northern France*, and the *Eastern United States*.

Asphalt.

Asphalt is found in *Cuba* and *Trinidad* (pitch lake). It is largely used for *paving*.

Export from *Trinidad* £205,000.

Meerschau.

Meerschau is a whitish mineral which is highly porous and rather soft. It is mostly used for the manufacture of *pipes*. The chief supplies of the substance are obtained from *Asia Minor*.

Manures.

Guano is a valuable manure possessing a pungent odour. It yields all the constituents of plant food in a condition readily assimilated. The chief supplies have been obtained from the *Falkland Islands* and the *islands* off the coast of *Peru* and *Patagonia*.

Export from *Peru*, £300,000; *Seychelles*, £31,000.

Saltpetre is a colourless solid having a bitter taste, and is very soluble in hot water. Its chief use is in the manufacture of *gunpowder*.

Export from *India*, £237,000.

Chile saltpetre occurs in several of the dry areas of *South America*. *Iquique* is the great port for its export. It is largely used as a *fertiliser*.

Export from *Chile*, £22,328,000.

EXERCISES.

1. What are the (1) existing (2) potential sources of iron ore for the use of British manufactures?
2. Name the districts of Europe which produce aluminium, zinc, lead, and copper.
3. What countries produce tin, manganese, and lead?
4. Name the most important coalfields of Britain, and point out the industries which have developed on each.
5. Locate the chief copper-producing areas of the world, and state the chief industrial uses of the metal.
6. Write a short account of the iron-smelting industry. Name the largest smelting centres of Britain, and give reasons for their development.
7. What is the world's chief source of tin? State the most important industrial uses of the metal.
8. Point out the main differences between iron ore, pig iron, cast iron, wrought iron, and steel.

9. Name the chief sources in the world for mica and zinc. State the uses of these substances.

Building Minerals.

Building Stone.

Stone, in order to be suitable for building purposes, should possess the two important properties of ability to stand great stress, and power to resist atmospheric influences. This latter is of great importance, especially when structures are meant to endure. Granite, sandstones, limestones, and marble are the most suitable building stones, and are largely used. (For Granite and Marble, see separate heading.)

Sandstone is very widely used, and the best probably is the *Craigleith stone*. This has been largely used in the neighbourhood of *Edinburgh*.

Limestones are very largely used in the south of *England*, and the best is the important *Portland stone*.

Magnesian limestone has a wide use, but it varies in quality according to the district in which it is quarried.

Oolitic limestone has a beautiful colour, and is used for special ornamental work.

Serpentine and *basalt* are sometimes used for building purposes, but their use is restricted owing to the difficulty experienced in working them up.

Artificial Stone.

Artificial stone has the great advantage of being easily moulded into any required shape. *Concrete* is the chief variety, and it is prepared by binding shingle or sand with cement. *Victoria stone* is largely used for paving purposes, and is made from powdered granite and Portland cement.

Clay.

Clay is the name given to various earths, which consist mainly of the silicates of aluminium iron, calcium, and magnesium. They are all plastic when moist, but hard when dry. These properties have made them useful from early times for the manufacture of *bricks*, *tiles*, and *pottery*.

Kaolin, or china clay, is the chief variety.

Potter's clay and *pipeclay* are of a yellowish or greyish colour, due to the presence of iron.

Fireclay is used in the manufacture of *fire-*

bricks and *crucibles*. It is generally found under seams of coal.

Shales are clays which have become hardened. They have a laminated structure.

Cement.

Cement is used to bind together the masses of stone, brick, etc., used in the construction of buildings and to combine particles into a mass. *Roman cement*, manufactured from London clay, was formerly largely used, but *Portland cement*, prepared from chalk or limestone, has superseded it. Portland cement was first manufactured on the Thames near Northfleet.

Slates.

Slates are metamorphic rocks, which were originally clays. They possess very fine cleavage, being readily split up into thin plates. The best slates are very durable, and are not affected by heat and moisture. Their chief use is for roofing purposes, but good slabs are often polished and enamelled in imitation of marble.

Slate mining is extensively carried on in *North Wales*, the quarries at *Penrhyn* and *Portmadoc* being noted. In *Ireland* good slate is obtained at *Valentia*, and in *Scotland* at *Aberfoyle*. In the *United States* the chief quarries are in the *North Atlantic States of Maine, Massachusetts, and Pennsylvania*.

Production of slate for United Kingdom, £972,000.

Granite.

Granite is an igneous rock of great beauty and value. It contains three distinct minerals—quartz, felspar, and mica. The colour of granite varies with the locality in which it is found.

The chief areas in which it is quarried are *Shap Fell* in *Cumberland*, *Peterhead*, *Aberdeen*, *Dalbeattie*, *Newry*, *Channel Islands*, *Sweden*, *France*, and *Canada*.

Marble.

Marble is a metamorphic rock consisting originally of limestone but changed by heat and pressure.

The finest white marble is quarried at *Carrara* in *Italy*, and for centuries it has been preferred by sculptors to any other marble. Other valuable marbles are those of *Connemara*, *Derbyshire*, and

Devonshire. Vermont, in the United States, produces good marble.

EXERCISES.

1. Name the chief building stones in general use, and state the chief areas in which each is found.
2. What do you understand by the term clay? What are its chief varieties? State their important uses.
3. What are the chief sources of supply in the British Isles of slate and granite?
4. Where is the world's best marble obtained? What other sources of supply do you know?

Precious Minerals.

Gold.

Gold is an exceedingly valuable metal and is found pure in nature. It is very widely distributed, and occurs in rock formations and alluvial deposits.

Victoria, in Australia, has in the past been noted for alluvial gold, and Ballarat in that state has the reputation of being the most important town the world has seen for alluvial deposits.

In rock deposits gold is usually associated with quartz. Such gold-bearing rock is crushed to a fine powder and the gold obtained by washing or chemical means.

Gold is very heavy, malleable and ductile. It is quite unaffected by the air. It is mainly used for *coinage* and the manufacture of *jewellery*.

The chief gold-producing countries of the world are *Australia, South Africa, the United States, Canada and Siberia.*

Transvaal Mines Gold Output.

1910	7,534,000 ounces
1911	8,237,000 "
1912	9,124,000 "
1913	8,795,000 "

The value of the world's annual output of gold is about £94,720,000, the British Empire supplying about 57 per cent. of the amount.

Gold Output for British Empire and United States.

Transvaal	£37,000,000
United States	18,206,000
Australasia	10,850,000
Canada	3,155,000
Rhodesia	2,903,000
India	2,390,000
West Africa	1,635,000

Silver.

Silver is obtained native and in combination with other metals. The chief ores of value are the sulphides and the combinations with lead. It is a hard metal possessing great malleability and ductility, and is a very good conductor of heat and electricity. It is used in the manufacture of *ornaments, table utensils* and for *coinage*. Baser metals are frequently coated with a thin deposit of silver by a process called *silver plating*. *Electro-metallurgy* has made the cost of plating comparatively cheap. Silver is chemically deposited on glass in the *manufacture of mirrors*, and *silver salts* are largely used in *photography*.

The chief areas of the world for the production of silver are the *United States, Mexico, Australia, and Canada.*

Silver Production.

Mexico	£8,966,000
United States	7,820,000
Canada	3,996,000
Austria	1,720,000
Germany	1,607,000
Peru	1,059,000
Australia	646,000
Bolivia	345,000

Nickel.

Nickel is chiefly obtained from iron pyrites and nickel blende (compound of nickel and sulphur). It is a hard, malleable and ductile metal, and is mainly used in the form of alloys.

Nickel steel contains about 3 per cent. of nickel, and is largely used in the manufacture of *armour plates*.

German silver is composed of brass, with about 20 per cent. of nickel, and is used in the manufacture of *spoons, forks, and electrical resistance wires*.

The chief supplies of nickel are obtained from *New Caledonia and Canada.*

Nickel Production.

Canada	£2,981,000
New Caledonia	260,000
United States	26,000

Precious Stones.

Diamonds are an allotropic form of carbon, and are always of crystalline structure. Their distinctive characteristics are extreme hardness and brilliancy. The hardness is so

great that they can only be ground and polished with their own dust.

The best diamonds are colourless, but pink, blue, yellow, green and red varieties are also known.

The most important diamond-producing centres of the world are *South Africa, India and Brazil*.

Diamond Production.

South Africa . . . £12,016,000

The *ruby* is inferior only to the diamond in hardness. The best stones are of a rich dark red colour and are very valuable. They are obtained mainly from *Burma, Ceylon and Siam*.

Emeralds have a green colour. They are chiefly obtained from *Siberia and New South Wales*.

The *turquoise* has a sky-blue colour when of the best quality. It is found principally in *Persia* and the *Western States of North America*.

Sapphires are only distinguished from rubies by their transparency and blue colour. The best stones are obtained from *Siam, Burma and Ceylon*.

Opals are not so hard as most precious stones and often lose their brilliance. The best varieties are obtained in *Queensland, New South Wales, Mexico and Hungary*.

Jade is a stone of a greenish colour. It is very hard, takes a fine polish, and is valued as an ornamental stone. The chief supplies are obtained from *South Asia*.

Indian Production . . . £11,000

EXERCISES.

1. Name the chief goldfields of Australia. In what form is the gold usually found?
2. Say what you can of the gold-mining industry of South Africa.
3. Name the most important gold-mining towns the world has seen, and indicate which are still important.
4. Where is the world's chief source of platinum? What are the chief uses of the metal?
5. Where are the largest deposits of nickel to be found? In what form is the metal usually discovered? What are its important uses?
6. Name the chief precious stones and indicate where they are to be found.
7. Which are the most important sources of supply of silver? Name the chief mining towns for the metal.

Foreign Coinage, Weights and Measures.

Almost all countries, with the exception of Britain and some of her possessions, have adopted the metric system of weights and measures and the decimal system of coinage. In such a system each separate money denomination is a power of ten of the next lower denomination. The adoption of a uniform system of coinage and weights and measures facilitates commercial intercourse between different nations, and the adoption of such a system has been repeatedly urged on the British Government. Doubtless in course of time this country will be compelled to adopt such a system and many disadvantages under which our traders now labour will be done away.

With regard to their coinage, countries are said to have either a gold standard or a silver standard, which means that the standard or unit coin is valued as equal to either (1) so much pure gold or (2) to the market value of a certain weight of pure silver.

The rate of exchange given is the intrinsic value which depends upon the quantity of gold the standard coin represents. This is called the *Par of Exchange* but its marketable value will vary from day to day and will depend upon the state of trade.

GOLD STANDARD COUNTRIES.

			Grams of Pure Gold	Exchange Value.
			Coin.	
United States	Dollar	100 cents	23.2199	49.20d.
The Latin Union	Franc	100 centimes		
— France, Italy,	Lira	100 centesimi		
Switzerland, and	(Italy)		4.4803	9.51d.
Belgium, and	Drachm	100 lepta		
Greece	(Greece)			
Germany	Mark	100 pfennige	5.5313	11.745d.
Austria	Florin	100 kreutzers	9.4099	19.385d.
Holland	Florin	100 cents	9.3159	19.84d.
Norway, Sweden, Denmark	Krone	100 ore	6.227	13.2d.
Turkey	Pound	100 piastres	102.0804	18.08d.
Spain	Peseta	100 centimes	4.4803	9.51d.
Portugal	Milreis	1000 reis	25.0885	53.278d.

SILVER STANDARD COUNTRIES.

Country.	Standard Coin.	Sub-Diris	Grams of Pure Silver in Standard Coin.	Exchange Value.*
India	Rupce	16 annas	165	—
Russia	Rouble	100 copeks	277.722	—
Mexico	Dollar	100 cents	377.168	—
China	Tael	1000 cash	516.405	—
Japan	Yen	100 sen	374.4	—

* Varies—for the exchange value in gold depends upon the market price of silver.

In Canada, including Newfoundland, the American coinage is copied, the currency being in dollars and cents.

The South American States have a similar system with the *pesa* (subdivided into cents) as the unit.

Most of the European countries have now adopted the metric system of weights as established by France at the close of the eighteenth century. The unit of length (the metre) on which the whole system is founded was originally taken as $\frac{1}{10,000,000}$ part of the distance from the North Pole to the Equator and is equivalent to 39.37 inches.

The units for area, volume, and weight, are all connected with each other and with the metre by simple relations thus:—

- 1 Are (standard of area) = 100 square metres.
- 1 Litre (standard of volume) = $\frac{1}{1,000}$ cubic metre.
- 1 Gram (standard of weight) = $\frac{1}{1,000}$ of weight of 1 litre of pure water.

Latin prefixes *deci* = $\frac{1}{10}$, and *centi* = $\frac{1}{100}$, and *milli* = $\frac{1}{1,000}$, are used to denote sub-multiples of these units, while Greek prefixes *deka* = 10, *hecto* = 100, and *kilo* = 1000 represent multiples of these units, thus 1 kilogram = 1000 grams, and 1 centimetre = $\frac{1}{100}$ of a metre and 1 deci-litre = $\frac{1}{10}$ of a litre.

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER III.

THE BRITISH ISLES.

CONTENTS.

World Position—Size and Divisions—Coasts.
England and Wales—Surface, Rivers and
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Surface.
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Vegetation and Animals—Fisheries.
Agricultural Centres—Mineral Wealth.
Manufactures—Textiles, Iron Industries,
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World Position.

The British Isles consist of two continental islands and a number of small islets adjoining the western shores of Europe. The position of these islands has influenced their climate, trade, and importance.

The British Isles are in the *centre of the land hemisphere*. Thus they are in the best position for trade.

Europe has a gradual slope to the north-west, and the long, navigable rivers flow that way. The British Isles have a gradual slope to the south-east, and these two slopes are separated by the narrowest parts of the North Sea and English Channel. Therefore *the trade of Europe converges to meet the trade of the British Isles across these narrow seas*.

The British Isles are near enough Europe for purposes of trade, and yet the narrow seas have caused them to be free from the *wars and plagues which have hindered the development of Europe*. These same narrow seas cause the islands to be less liable to invasion, and it is not necessary to maintain such large armies as in Germany, France, Russia, etc.

Size and Divisions.

The British Isles extend through 11 degrees of latitude. Their area is roughly 120,000 square miles, or little more than half of France. They are divided into England, Scotland, and Wales (forming Great Britain), and the separate island of Ireland.

The islands being small, and possessing an extensive coast-line in proportion to their size, no land is far from the sea, and therefore:—

- (a) Each part is near enough the sea for trade.
- (b) Each part feels the climatic influence of the sea.

Coasts.

The British Isles possess a very extensive coast-line. The west coast consists of old, hard rocks, which have been worn into long, narrow openings with projecting headlands of old rocks between. The east coast is made up of younger, softer rocks, and the sea has worn it into smoother and more regular outlines.

gap through Lincoln Edge, draining to the Wash.

The rivers running to the Wash—the *Welland*, *Nen*, and *Great Ouse*—drain the gradual slope of the Northampton Uplands, and in their lower courses flow through flat ground known as the *Fens*.

Draining from the chalk ridge and flowing across the fertile lands of East Anglia (Norfolk and Suffolk) and Essex are many small rivers, of which the chief are the *Yare*, *Waveney*, *Irwell*, *Stour*, *Colne*, and *Blackwater*.

The *Thames* rises in the gradual slopes of the Cotswold Hills, and is joined at Oxford by the *Cherwell* from the Northampton Uplands. It cuts the chalk ridge before receiving the *Kennet* at Reading, and then flows through the clay plains of the lower Thames basin, receiving the *Colne*, *Lea*, and *Roding* from the chalk ridges on the north, and the *Wey*, *Mole*, *Medway*, and *Stour* on the south.

Rivers of the South.

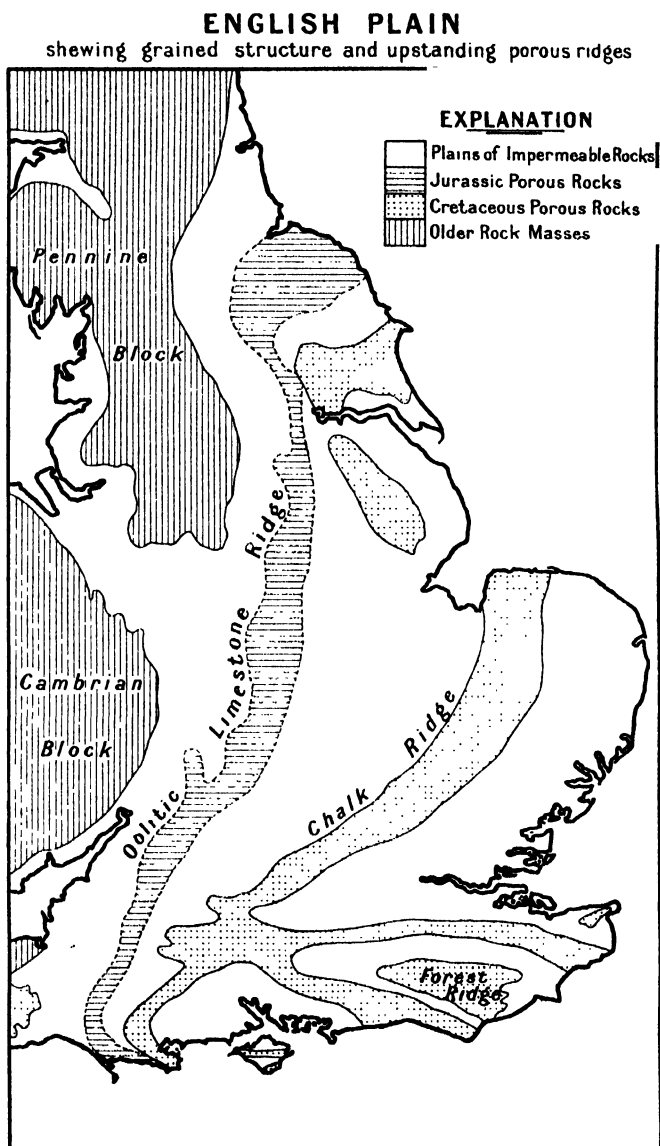
Between the North and South Downs is the Weald, in which rise the *Ouse* and the *Adur* flowing to the south coast. West of this the Hampshire Basin, between the South and Western Downs, is drained by the *Itchen*, *Test*, *Avon*, and *Stour*, with the *Frome* flowing from the west.

Rivers of the South-West.

The Plain of Devon is drained by the *Exe* on the south-east and the *Torridge* and *Taw* on the north-west. The *Tamar* flows between Dartmoor and Bodmin Moor. The Plain of Somerset, between the Mendips and Quantocks, is drained by the *Parret*, with its tributary the *Tone*, flowing through the Vale of Taunton.

The Severn and Rivers draining to the Bristol Channel.

The *Severn* rises in Plynlimmon, and after flowing eastward curves round the eastern



Fig

boundary of the Welsh Mountains and empties into the Bristol Channel. Its chief tributary is the *Warwick Avon*, which drains from the western side of the Northampton Uplands, through the Vale of Evesham, to join it on its left bank. The *Wye* and the *Usk* take

similar courses to that of the Severn before entering the Bristol Channel. The *Bristol Avon* rises in the chalk ridge, cuts through the Cotswolds at Bath, and flows into the Channel below Bristol.

Welsh Rivers.

The Berwyn Mountains form a water-parting dividing the Severn from the *Dee* and *Clwyd* flowing north. The *Teifi* and the *Towy* flow in valleys parallel to the mountains, while the *Taff* drains the South Wales coalfield.

EXERCISES.

1. Look carefully at the Route Map and note the positions of Winchester, Lincoln, Guildford, Canterbury, and give reasons why they are important.
2. Name the chief plains of England. In each case show why they are plains, and name the rivers draining them.
3. Name the three most important rivers of England and Wales, giving reasons for their importance.

Scotland—Surface.

Look at the Map of Scotland, and draw a line from *Dumbarton* to *Stonehaven*. North-west of this lie the highlands of Scotland, south-east of it lie the lowlands and hills. The mountain mass is crossed by the long, narrow valley *Glenmore*, stretching from *Moray Firth* to *Loch Linnhe*, and this divides the mountain area into two parts, known as the *Northern Highlands* and *Southern Highlands* or *Grampians*. Notice that just south of the Grampians, and stretching across the country from south-west to north-east, is a long valley, known east of the Tay as *Strathmore*. This valley is separated from the lowlands of Scotland by a line of hills, known as the *Sidlaws*, *Ochils*, *Campsie Fells*, and *Renfrew Heights*. The lowlands, or *Central Plain of Scotland*, stretch between the Firth of Clyde on the west and the Firth of Tay on the east. South of the Central Plain are a number of hill ranges forming the *Southern Uplands* and extending to the Cheviots, which form the border between England and Scotland.

The Northern Highlands.

These lie to the north of Glenmore, and stretch from Loch Linnhe to Cape Wrath in the west. The steep slope of the mountains is to the west, while the more gradual eastern slope is drained by short rivers. Along the east coast is a coastal plain or sill, which widens out in the north to form the *Plain of Caithness*. The *Outer Hebrides*, on the west, once formed part of the mainland, but a fracture of the earth's crust, similar to that which caused the Central Plain, created *The Minch*, which now separates these islands from the mainland. Nearer the coast, and separated from it by narrow straits, are the *Inner Hebrides*, many of which are volcanic in origin. The Plain of Caithness is continued on the other side of Pentland Firth by a group of islands known as the *Orkneys*, while the *Shetlands*, still farther north, are a further continuation of the rock structure of the mainland.

The Southern Highlands, or Grampians.

These lie between Glenmore and Strathmore.

The general direction of the ridges is from south-west to north-east, reaching from the Mull of Kintyre to the east coast between Stonehaven and Kinnaird Head. Running parallel to these ridges are the rivers *Findhorn*, *Spey*, *Deveron*, *Dee*, and *Don*. The *Tay* and *Forth* cross the ridges and connect many tributaries draining the longitudinal valleys. The Grampians terminate abruptly on the south, and a longitudinal valley separates them from the line of volcanic hills running parallel with them. The *Lower Tay* cuts across *Strathmore* and makes a gap between the *Sidlaw* and *Ochil Hills*. The *Forth* similarly cuts a gap between the *Ochils* and *Campsie Fells*, while the *Clyde* from the south crosses between the *Campsie Fells* and the *Renfrew Heights*.

The *Spey*, *Findhorn*, *Deveron*, *Dee* and *Don*, flowing in the same direction as the mountains, are known as longitudinal rivers, and have few tributaries.

The lower courses of the *Tay* and *Forth* cut across the ridges at right angles, and are therefore known as transverse rivers. Notice that the Upper Tay and its tributaries, the *Tummel* and *Garry*, are longitudinal rivers draining long, narrow lakes, of which the chief are *Lochs Tay*, *Ericht*, and *Rannoch*. The

Forth is similar to the *Tay* in that its upper course and its tributary, *Teith*, are longitudinal rivers which drain many lakes, of which the most notable is *Loch Katrine*. The district round *Katrine* is known as *The Trossachs*, and the picturesque lake and mountain scenery attracts numerous visitors. *Loch Lomond*, near to *Katrine*, drains south to the *Firth of Clyde*, and it would be possible by connecting the upper end of *Loch Lomond* to *Loch Katrine* to make a through waterway, passing some of the most beautiful scenery in the British Isles, from the *Clyde* to the *Forth*.

The Central Plain.

This occupies the narrowest part of Scotland, between the *Firths of Forth and Tay* on the east and the *Firth of Clyde* on the west. The lower courses and long estuaries of the rivers make easy communication between east and west. This plain is the most important part of Scotland, and supports three-quarters of the whole population of the country on its rich coalfields and fertile plains. The *Carse of Gowrie*, south of the *Sidlaw Hills* and bordering the northern shore of the *Firth of Tay*, is a very fertile area producing large quantities of fruit.

The Southern Uplands.

These lie south of the Central Plain and consist of rounded hills, mostly grass covered. The *Cheviots* form the boundary between England and Scotland, the greater part of them lying on the Scottish side of the border. They are drained by the *Tweed* and *Tweed*. The *Gala Water*, a tributary draining south to the *Tweed*, divides the *Lammermuir Hills* on the east from the *Moorfoots* and *Pentlands* on the west. The *Lothians* or *Lead Hills*, and their extension to the west coast, form a water-parting between the rivers *Nith*, *Annan*, and *Esk* flowing south to *Solway Firth* and the *Clyde*, *Ayr*, and *Doon* flowing north to the west coast.

EXERCISES.

- Which rivers cross Strathmore? Name the important towns situated at the gaps between the hills dividing it from the Central Plain.
- In which part of Scotland will all the manufactures be carried on, and why?
- Why is the west coast of Scotland so deeply indented?

Ireland—Surface.

Ireland differs from Great Britain in the arrangement of its mountains. These are situated round the coast, while the centre is composed of a saucer of porous limestone covered over in most parts with boulder clay. The high lands do not form one continuous wall round the coast, but are broken into detached masses with coastal plains between, especially in the east and west. This allows of easy access to the coast.

The wet climate and the non-porous boulder clay causes the *bogs* which occupy a great portion of the Central Plain.

South-West Ireland.

Consists of the parallel ranges of the *Kerry Mountains*. These form the highest land in Ireland, *Carran Tual* rising to 3500 feet. The valleys opening out to the west form "rias" known as *Dingle Bay*, *Bantry Bay*, and *Kenmare River*, separated by projecting headlands. Towards the east the valleys are drained by the longitudinal rivers *Bandon*, *Lee*, *Blackwater*, and *Suir*. Each of these cuts through a gap to the coast, forming the harbours of *Kinsale*, *Cork*, *Youghal*, and *Waterford*. *Kinsale*, *Cork*, *Youghal*, and *Waterford*, each situated at the outlet of a longitudinal valley, export the produce of the interior, but the *Mallow Gap* behind *Cork* allows of easy communication inland to the *Golden Vale* and *Central Plain*, thus adding greatly to the importance of that town.

South-East Ireland.

The parallel ranges of the *Kerry Mountains* are continued eastward by other ranges. In the *Slieve Bloom Mountains*, farther north, rise the rivers *Nore* and *Barrow*, which flow to the south and join the *Suir* in *Waterford Harbour*.

The meeting of the *Suir*, *Nore*, and *Barrow* causes *Waterford* to be the outlet of three valleys exporting large quantities of dairy produce to *Bristol*.

The *Wicklow Mountains*, occupying the south-east of Ireland, are drained by the *Slaney*, flowing south to *Wexford Harbour*, and the *Liffey*, flowing north to *Dublin Bay*.

The *Wicklow Mountains* are similar to the mountains of North Wales, containing many picturesque valleys and lakes. On the west side the *Slaney* rises and flows south through a fertile valley to *Wexford Harbour*, which is just opposite to the south-west peninsula of Wales.

The Eastern Plain.

Between the Wicklow and Mourne Mountains is a level plain (just opposite that of Lancashire) which forms an easy gateway into Ireland. The *Boyne* flows through this plain, entering the sea at *Drogheda*.

North-East Ireland.

The *Mourne Mountains* lie north of *Dundalk Bay*, and in them rises the *Bann*, which flows to *Lough Neagh*, the largest lake in the British Isles. It runs north after leaving the lake to *Coleraine*, between the *Plateau of Antrim* and the *Sperrin Mountains*. To the east of *Lough Neagh* the *Lagan* finds an outlet to the commodious harbour of *Belfast Lough*.

The lowlands between the mountains of the north-east allow of routes into the interior from *Belfast* and *Strangford Loughs* via the *Lagan*, from *Coleraine* by the *Bann*, and from *Dundalk Bay*, while the *Black-water* allows easy access to the *Central Plain*.

North-West Ireland.

The mountains in this part have the same south-west to north-east trend as the Grampians, to which they are related in structure. The river *Foyle* flows between the *Sperrin* and *Donegal Mountains*, and empties into *Lough Foyle* at *Londonderry*. Between the *Donegal* and *Sligo Mountains* the river *Erne*, draining the lakes of *Upper* and *Lower Erne*, flows through a narrow plain to the coast at *Ballyshannon*.

Western Ireland.

Sligo Bay forms an outlet between the *Sligo* and *Ox Mountains*, while the *Mountains of Mayo* in the extreme west are separated from the *Ox Mountains* by a narrow plain in which is situated *Lough Conn*. South of the *Mountains of Mayo*, and separated by *Clew Bay*, are the *Connemara Mountains*, with *Slyne Head* as their western extremity. To the east of these *Lough Mask* and *Lough Corrib*

drain to *Galway Bay*. Between *Galway Bay* and the mouth of the *Shannon* is a less mountainous peninsula ending in *Loop Head*.

Central Plain.

The centre of Ireland is one great plain broken only by low hills. Much of it consists of bogs, and the greater part is drained by the *Shannon* and its tributaries.

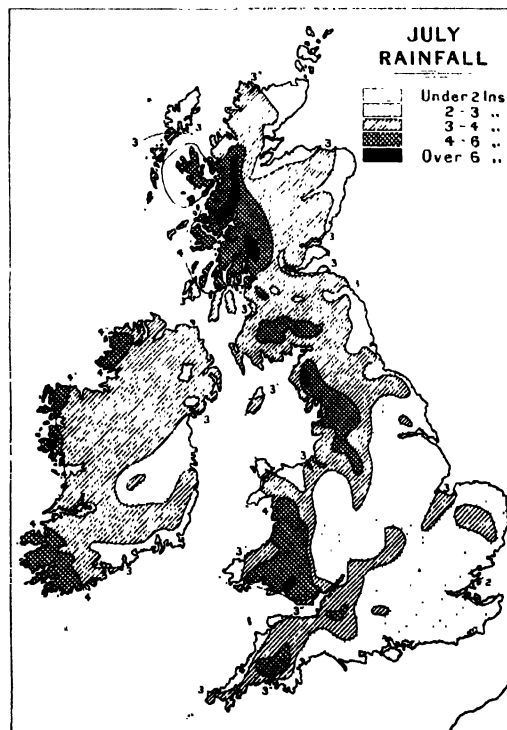
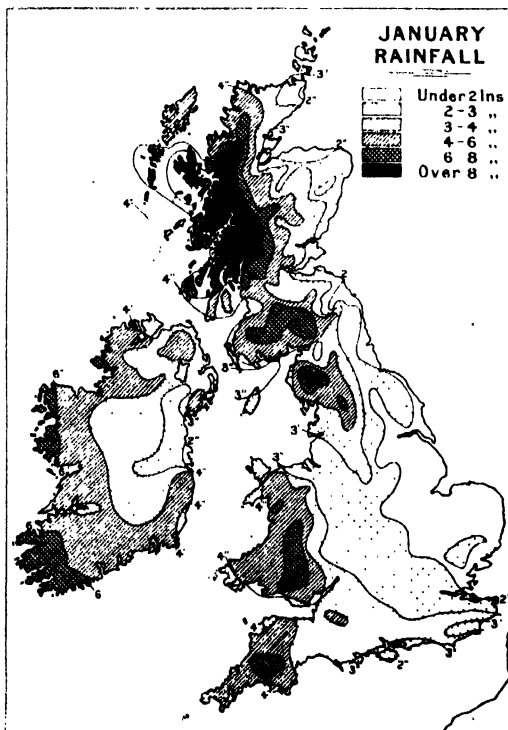
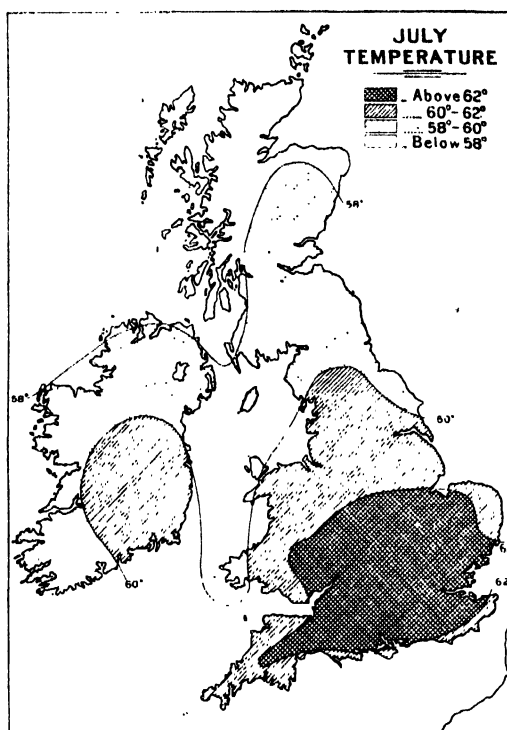
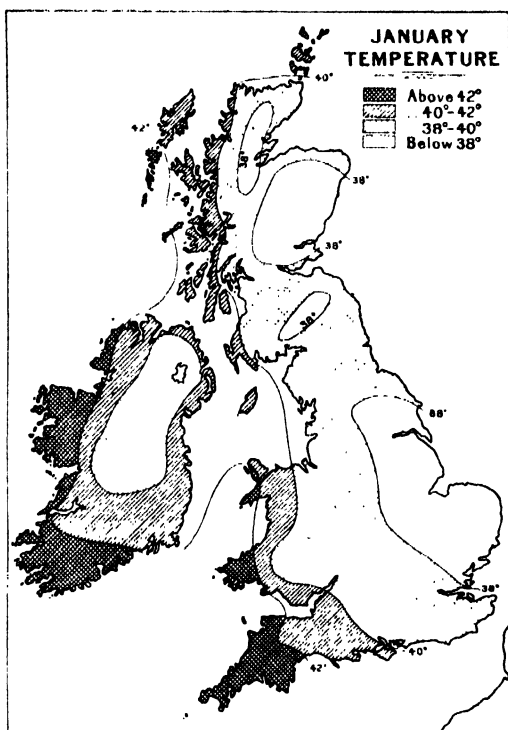
The *Shannon* is the longest river in the British Isles, and rises on the south side of the *Sligo Mountains*. Between *Lough Allen* and *Killaloe*, at the southern end of *Lough Derg*, it falls at the rate of 9 inches to a mile. Hence it is a very slow river, and has time to hollow out the soft limestone to form *Loughs Allen, Ree, and Derg*. In this part of its course it receives the *Suck* from the west and the *Brosna* and *Little Brosna* from the east. Below *Killaloe* the river flows between the *Slieve Bernagh* and the *Silvermine Mountains*, and descends at the rate of 60 inches to the mile to *Limerick* at its mouth. South of *Limerick*, and north of the *Kerry Mountains*, is a fertile plain known as the *Golden Vale*.

EXERCISES.

1. Describe the *Shannon*. Draw a comparison and a contrast with the *Severn*.
2. Where are the chief bogs in Ireland? To what causes are they due?
3. Describe the *Central Plain*, and name its extensions to the coast between the highland masses.
4. Why have all invasions into Ireland taken place from the east coast?
5. Why is the population of Ireland fairly evenly distributed, while that of Scotland is nearly all found in one-fourth of its area?

Climate of the British Isles.

Notice the January isotherms on Map 16, and you will see that the coldest parts of the British Isles are the east of Scotland and east of England. These have an average temperature of less than 38°, while the west coast averages between 41° and 42°, with a temperature of above 44° in the south-west extremities of Ireland and Great Britain. Compare the January isotherms with the July isotherms (Map 17), and notice that the west has the



coolest summer, with a temperature ranging from 55° to 59° F., and the east has the hottest summer, with a temperature between 63° and 64° . Look again at the winter isotherms, and note that their general direction is from north to south, which means that the north is as warm as the south, and that it is colder in the east than in the west. The summer isotherms travel in an east and west direction, and the north is cooler than the south. The greatest rainfall is in the west, the driest parts are in the east. The parts of the west having the greatest rainfall correspond with the highest surface elevations, while those areas sheltered by mountain barriers have least. A comparison of the January and July Rainfall Maps will show that the rainfall is greatest in winter, but that some rain falls throughout the year. We have deduced from the maps the following facts:—

- That the greatest range between summer and winter temperature is only 26° F., and that the least range is only 13° F. This means that the British Isles have an equable climate.
- That the east is subject to greater extremes than the west.
- That the temperature varies as we travel from west to east in winter, and from south to north in summer.
- That the greatest rainfall occurs in winter, though some rain falls all the year.
- That the west has the greatest amount of rain.
- That the rainfall is greatest where the land is highest.

EXERCISES.

1. Contrast the temperatures and rainfall of south-east England and south-west England. Give reasons for differences.
2. Which part of Ireland has the greatest range between its summer and winter temperature? Give reasons.
3. Name the parts of Scotland having the greatest and least rainfall, giving reasons where possible.
4. Which part of Ireland has the greatest and which the least rainfall? Give reasons.

Vegetation and Animals of the British Isles.

It has been already shown that vegetation depends upon climate and soil. The surface

and climatic maps should now be compared to verify the facts for the British Isles.

Pasture Areas.

The pasture areas are chiefly in the wetter west, while the eastern plains are mostly agricultural lands. The lowland pastures are best suited for cattle rearing, and the poorer grass of upland areas supports sheep. On the chalk and limestone ridges of England sheep are particularly plentiful.

Cattle thrive on the soft, rich grass lands of the wetter west. *Cheshire*, *Hereford*, *Gloucester*, *Somerset*, and *Devon* support large quantities of cattle, which are also reared in *Durham* (Shorthorns), in *Leicester*, in *Northampton*, and in the *Vale of Aylesbury*. The grassy plains of Ireland are also great cattle-producing areas. All these districts yield milk produce, *Cheshire*, *Gloucester*, *Somerset* (Cheddar), and *Leicester* (Stilton), being specially noted for *cheese*, while *Ireland*, *Devon*, and *Dorset* supply large quantities of *cream* and *butter*. The cattle of *Wales* and those of the mountain areas of *Scotland* do not supply dairy products, but yield good *beef*.

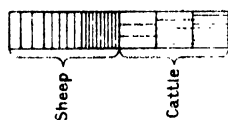
Sheep.—The well-drained porous limestone and chalk ridges grow a short grass upon which sheep thrive. These hills support more sheep to the acre than does the wiry grass found on the poorer soils of the western highlands, which produce sheep noted for their *mutton* (e.g., *Wales*). The porous ridges feed the *wool-producing* sheep, which are found chiefly on the *Southern Uplands* of *Scotland* (Cheviot and Tweed cloths), *Yorkshire Moors* and *Downs*, *Cotswold Hills* (West of England cloth and Witney blankets), *Chiltern Hills*, and *North and South Downs*.

Pigs are numerous in Ireland, but *Wiltshire* and *Berkshire* are noted for their *bacon* and *Cumberland* for its *hams*.

Horses are bred chiefly in *Clydesdale* and *Yorkshire*. *Ireland* produces some of the best hunters.

Wheat.—The dry summer of the east of England is sufficient to ripen it, while the clay soil of this district and the Thames basin holds sufficient moisture at the roots when it is required. The wheat of the Thames basin causes *Reading* to be noted for *biscuits*, and the wheat straw of *Bedford* is responsible for a *straw-plait* industry.

Map 21.



BRITISH ISLES. SHEEP AND CATTLE.
(DENSITY SHOWN BY SHADING)

Oats are plentiful in *Scotland, Ireland*, and the *west of England*.

Barley.—The barley of the Midlands causes *Burton-on-Trent* to be noted for *brewing*, and the *eastern river valleys of Scotland* to be famed for *whisky*.

Root Crops.

Potatoes are grown largely in *Ireland* (where they form the chief food of the people), and also in *Yorkshire, Lincoln*, and the *Central Plain of Scotland*.

Turnips are plentiful in the *south of Scotland*, and also in *East Anglia*.

Fruit and Hops.

Both of these require a very rich soil and a warm, sheltered climate. The rich soil of *The Weald* accounts for the noted *fruit and hop gardens* of *Kent* and *Surrey*. The alluvium brought down by the rivers from the Welsh Mountains, together with the warm, sheltered climate on the lee side of these, allows *Hereford, Worcester*, and the *Plain of the Severn* to grow hops and fruit.

The *Carse of Gowrie*, under the shelter of the Sidlaw Hills, is a noted fruit-growing region, hence *Dundee* is famed for its *jams*.

The *Plain of Devon* is a rich area between Exmoor and Dartmoor also important for its *fruit*.

Market Gardens.

These gardens, supplying vegetables for the centres of population, are found on the outskirts of large towns. Hence much of the land in *Middlesex, Surrey, Kent*, and *Essex* is occupied by market gardens, which supply the huge population of London. The greater warmth of the south-west produces the *early flowers* and *vegetables* of *Cornwall* and the *Scilly Isles*.

Flax, used in the manufacture of linen, is grown chiefly in the *north-east of Ireland*. The climate is not warm enough to ripen its seeds, hence no linseed is obtained, but merely the fibre from the stalk from which linen is manufactured.

Forests.

The British Isles were once covered with forests but of these little remains. The New Forest of Hampshire, the Dean Forest (west of the lower Severn), Sherwood Forest in Nottingham, and Epping Forest in Essex are still in existence.

The Scottish Highlands are covered with wild moorland and deer forests.

Wild animals have disappeared with the clearance of the forests. Fox and deer are preserved for sport, also grouse, partridges, and pheasants. Rabbits are plentiful.

The oak and the beech trees produce the most useful woods. Elm and ash grow in all parts, while on the colder northern highlands the birch and Scotch fir predominate.

Fisheries.

The shallow seas surrounding our shores abound in sandbanks, which form excellent breeding grounds for fish. The fishing industry is an important occupation in the coast towns of the North Sea and Cornish Peninsula.

Herring, haddock, and cod are the chief fish caught in the *North Sea*, and pilchard and mackerel in the *English Channel*.

Grimsby, at the Humber mouth, is the great fishing port for the *Dogger Bank*, but fleets also go out from *Hull, Yarmouth*, and *Lowestoft*.

Aberdeen, within easy rail access of Edinburgh, Glasgow, and even London, is the chief centre in Scotland, but *Lerwick*, in the Shetlands, has also an important fishing fleet. In the shallower waters to the east of the Outer Hebrides fish are also caught, and the industry in this group of islands is centred at *Stornoway*. *Portree*, in Skye, is another fishing centre, while *Loch Fyne* is noted for its *herrings*.

On the east, in addition to *Aberdeen*, are the fishing harbours of *Stonehaven, Peterhead*, and *Fraserburgh*, the last two being at one time whaling stations. The proximity of all these harbours to Norway, from which they obtain both salt and barrels, proves an advantage.

The herring fishing is a source of considerable wealth, the bulk of the fish caught being sent to the Baltic countries. A shore population of women-workers, mostly Highland, accompanies the herring fleet in its annual progress round the coast. The fishing starts in May from Stornoway and the Orkney ports. By July the fleet has moved to the Moray Firth and Aberdeenshire ports, and the year's work concludes at the English ports of Lowestoft and Yarmouth in November.

The coalfields of Great Britain have three great advantages:—

- (1) The coal and iron are found together.
- (2) Limestone, useful for smelting, is often found with them.
- (3) The coalfields are within easy reach of the sea.

The coalfields surrounding the Pennines are: The *Northumberland and Durham*, the *West Riding of Yorkshire*, the *Nottingham and Derby*, the *Lancashire*. This line of coalfields is continued on the north side of the Cumbrian Group to the sea, where rich deposits are mined round *Whitehaven*.

The Welsh coalfields start in the small deposits of *Flint* and *Denbigh*, are continued through the *Shropshire* and *South Staffordshire* to the *Forest of Dean* and *Bristol* fields on either side of the Severn estuary. In *South Wales* they reach from *Newport* in the east to *Pembroke* in the west.

The coalfields of Scotland are found in the Central Plain, and include the *Glasgow and Ayr*, the *Central, Lothian*, and the *Fife* or *Eastern* coalfields.

The small amount of *coal* and *iron* found in *Ireland* does not pay for working because—

- (1) The coalfields are small and far apart.
- (2) The coalfields are not near the coast.
- (3) Coal and iron are not found close together.

The greater part of the coal produced in Great Britain is consumed in manufactures or for domestic purposes, but the steam coal of *South Wales* is largely used in shipping.

Rich *iron* deposits are found in the *Cleveland* district of North Yorkshire, and these caused the rapid growth of *Middlesborough*, which smelts the iron with coal from the *Tees* coalfields. Another deposit in the *Furness district* of *North Lancashire* was responsible for the development of *Barrow*. Smelting is also carried on largely on the *South Staffordshire* and *South Wales* coalfields.

In addition to our own iron deposits, much ore is imported from Sweden and North Spain, and smelted chiefly in *South Wales*.

Some *tin*, *copper*, *lead*, and *zinc* are also found in the British Isles.

Copper and *tin* are found in small quantities in *Devon* and *Cornwall*, and these are sent to the coalfields of *South Wales* to be smelted. The industry here has been largely increased by imports of copper and tin ores from Spain and other countries, hence the growth of *Swansea*, *Merthyr-Tydvil*, and surrounding towns.

Lead is obtained in *Cumberland*, *Derbyshire*, the *Isle of Man*, the *Lowther* or *Lead Hills* of Scotland, and in the *Wicklow Hills* in Ireland.

Zinc is found in *North Wales*, *Cumberland*, and the *Slieve Bloom Mountains*.

The mineral wealth of the British Isles includes valuable supplies of *building stone*, *clay*, *slate*, *granite*, and *marble*.

Building stone is obtained from the *Dorset Heights* at *Portland*, the *Cotswolds* at *Bath*, the *North York Moors*, the *Southern Pennines*, and the *Southern Uplands of Scotland*.

Clay, used in the manufacture of bricks, is plentiful in the *Thames basin* and east of *England*. *Fire clay* is found in the *South Midlands*; and *pottery clay* is obtained from the denudation of the granite in *Cornwall*.

Slates of the best quality are quarried in *North Wales*, but there are also workings in *Cumberland*, *Westmoreland*, and along the southern margin of the *Grampians*.

Granite is quarried at *Aberdeen* and *Peterhead*, and also in *Cumberland*, *Cornwall*, and *Devon*.

Marble is found in small quantities in *Derby*, *Devon*, and *Kilkenny*.

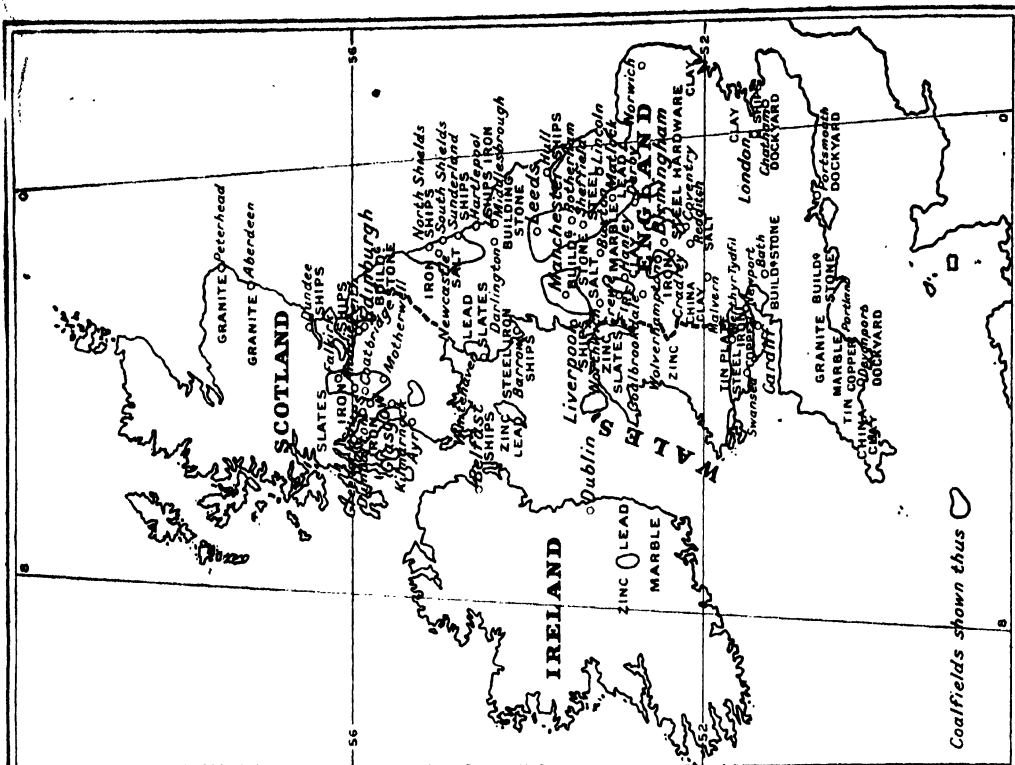
Salt is obtained from mines in *Cheshire* and from mineral springs in *Worcester*.

The salt towns of *Cheshire* are *Northwich*, *Middlewich*, and *Nantwich*, and the mineral springs of *Droitwich* are famous.

Mineral Springs.

These are caused by water sinking through porous rocks and dissolving certain medicinal minerals from them. This, rising to the surface as a spring, accounts for the growth of towns such as *Harrogate* in Yorkshire, *Matlock* and *Buxton* in the Derbyshire Pennines, *Malvern* in the Malvern Hills overlooking the Severn, and *Bath* in Somerset.

Map 24.



DISTRIBUTION OF MANUFACTURES.

DISTRIBUTION OF MINERALS AND IRON INDUSTRIES. BRITISH ISLES.

EXERCISES.

1. Name the coalfields (1) situated on the coast, (2) within easy reach of the sea, (3) those inland.
2. Draw a map of the Pennine area, inserting carefully the rivers. Show, by shading, the exact position of the coalfields.
3. Draw a map of the Welsh border, inserting carefully the rivers. Show, by shading, the exact position of the coalfields.
4. Explain why Ireland as a whole is not a manufacturing country.
5. Upon what does the importance of Harrogate, Matlock, Buxton, Malvern, and Bath depend? Give the position of each town.
6. Draw a map of the British Isles, and insert the localities where the chief minerals used in building are found.

Manufactures.

During the Middle Ages Great Britain was a pastoral and agricultural country, and the north of England and South Wales were then very thinly peopled. The growth of steam power and the demand for coal and iron caused the rapid development of manufactures and centres of dense population situated on the coalfields.

The three countries producing the most coal and iron are the *United States, Germany, and Great Britain*. The same three are the chief manufacturing countries.

Manufactures are chiefly carried on on the coalfields, because it is cheaper to carry raw material to the coalfield than *vice versa*.

The manufactures carried on in different districts are largely determined by geographical conditions, but the position of the coalfields decides the following:—

- (1) Those within *easy access to the coast*—textiles which require import of raw material.
- (2) Those *on the coast and river mouths*—shipbuilding.
- (3) Those *far removed from the coast*—material found locally and requiring no import, e.g., hardware of Staffordshire.

Textiles.

The most important textiles manufactured in the British Isles are woollen, cotton, and linen goods. *Woollen goods* are made chiefly in Yorkshire, the south of Scotland, and west of England.

The geographical conditions which decided the woollen manufacture of Yorkshire were:—

- (1) The deposits of coal and iron.
- (2) The supplies of water brought from the Pennines by the tributaries of the Ouse.
- (3) The drier climate found on the east slope of the Pennines.
- (4) The easy access to the sea through the ports of Hull and Goole.

The centre of this industry is *Leeds*. *Bradford* manufactures worsteds, and *Halifax* blankets and carpets, while *Huddersfield, Wakefield, and Dewsbury* are all engaged in the industry.

The sheep bred on the Southern Uplands of Scotland are responsible for the Tweed and Cheviot cloths manufactured at *Gala-shiels, Hawick, Selkirk, and Dumfries*.

A woollen industry is carried on on the central coalfield of Scotland, the chief towns engaged being *Stirling* and *Alloa*. The Highlanders of North Scotland and the people of the *Outer Hebrides* weave tweed cloths by hand looms. *Shetland* manufactures woollen shawls.

The sheep bred on the hills have caused a small woollen manufacture to spring up at *Stroud* (Gloucester) and *Trowbridge* (Wiltshire), in the west of England. Wool from the same district has made the carpets of *Wilton* famous.

Witney, in Oxfordshire, manufactures blankets from the wool of sheep reared on the Oxfordshire hills.

Leicester, situated on a coalfield, is the centre of the woollen hosiery industry.

Cotton goods require a damp climate for high tension weaving, and hence are chiefly manufactured on the west side of the Pennines, on the Lancashire coalfield.

The easy access to the sea, the coal and iron, the water supply from the Pennines, and the damp climate all tended to make Lancashire the cotton county. The great centre of the trade is *Manchester*, now directly connected with the sea by the Ship Canal. The chief cotton towns are grouped round the Ribble (*Preston* and *Blackburn*) or round the Mersey (*Oldham*). The cotton waste has made *Bacup* noted for *paper*.

Scotland manufactures cotton goods on the Clyde coalfield, *Paisley* being especially noted for *cotton thread*.

On the *Nottinghamshire* coalfield, where the climate is too dry for close weaving, *cotton hosiery* is made.

Linen, from the stalk of the flax plant, is manufactured in North Ireland, the east coast of Scotland, and the estuary of the Tees.

In North Ireland the flax is grown, and this, with the easy import of coal, has caused a linen industry in North-East Ulster. The centre of the industry is *Belfast*, but *Londonderry*, *Newry*, and *Drogheda* are also engaged in it.

The linen and similar industries of the east coast of Scotland depend upon the import of flax and hemp from the Baltic, as well as upon the proximity of the Fife coalfield. *Dundee*, *Montrose*, and *Arbroath* make sailcloth and rope for the fishing industry. *Dundee* and *Dunfermline* make fine linen, especially tablecloths, and *Kirkcaldy* manufactures linoleum.

The linen of the Tees basin is largely dependent upon the import of Baltic flax. *Darlington*, *Stockton*, and *Sunderland* manufacture sailcloth and linen; while the latter is also made at *Barnsley*, in Yorkshire.

Silk is not manufactured largely in the British Isles. The counties engaged in the industry are Derbyshire, Staffordshire, and Cheshire, where the pure water, so necessary in the manufacture, is obtainable.

The Iron Industries.

These are carried on in connection with most of the coalfields. The *Clyde*, *Tyne*, *Wear*, and *Tees estuaries*, in addition to *Belfast*, are noted for *shipbuilding*. *Iron smelting* is carried on round *Merthyr Tydvil* and *Monmouth*, in the *Barrow-in-Furness* district, at *Middlesborough* in the Cleveland district, on the *Cumberland coalfield*, on the *North and South Staffordshire coalfields*, at *Airdrie*, *Coatbridge*, and towns in the Clyde basin. *Steel works* are situated at *Newcastle*, *Middlesborough*, and *Sheffield*, the last named manufacturing *cutlery* and *tools*. *Hardware goods* of all descriptions are made on the *South Staffordshire coalfield*, while the *tin plate* industries are important in *South Wales*.

Shipbuilding.

The *Clyde ports* include *Glasgow*, *Greenock*, and *Dumbarton*. These have the largest steel shipbuilding industry in the world. The rich supplies of coal and iron, the estuary which has been artificially deepened, and the easy access to all parts of the Central Plain are geographical causes contributing to their importance.

The *Tyne ports* include *Newcastle*, *North and South Shields*, *Gateshead*, *Jarrow*, and *Tynemouth*. The chief industry here is the building of warships for our own and foreign navies, and this has led also to a manufacture of guns.

Sunderland, at the mouth of the *Wear*, and *Hartlepool*, at the Tees estuary, both have an increasing shipbuilding trade.

Belfast has a deep harbour, and its proximity to the Ayr coalfield and the Furness iron district enable it to build some of the largest liners.

The chief naval dockyards are *Devonport*, *Portsmouth* and *Chatham*.

Iron Goods.

The *South Staffordshire coalfield* reaches into Warwickshire and Worcestershire, and is usually known as the *Black Country*. Its chief centre is *Birmingham*, and other towns are *Wolverhampton* and *Wallall*. These manufacture all kinds of iron goods, including screws, nails, locks, bedsteads, and engines. *Cradley* makes chains, *Coventry* cycles, and *Redditch* needles.

Sheffield is noted for its cutlery because of the coal and iron found there and the grinding stones which are quarried near by. During recent years this town has manufactured large quantities of armour plates and steel rails.

In Scotland iron goods are made at *Coatbridge*, *Motherwell*, and *Airdrie* on the Clyde coalfield, and at *Falkirk*, the latter being noted for stoves of all descriptions.

The *Furness district* manufactures steel rails. *Manchester*, *Birmingham*, *Glasgow*, and *Newcastle* make steam engines and railway carriages. *Crewe*, on the London and North-Western Railway, *Swindon*, on the Great Western Railway, *Doncaster*, on the Great Northern Railway, *Derby*, on the Midland, *Darlington*, on the North-Eastern Railway, and *Kilmarnock*, on the Glasgow and South-

Western, have important works for their respective railways.

The smelting of iron and tin on the *South Wales coalfield* has caused the rapid growth of the tin plate industry in that district. (*See Oil Palm*, p. 55.)

The *Shropshire coalfield*, with *Coalbrookdale*, is engaged in hardware industries. Manufactures of lesser importance include *brass* at *Rotherham* and *Birmingham*, and *agricultural implements* at *Lincoln*, *Norwich*, and *Ipswich*.

Glass and Earthenware.

These manufactures require a large amount of fuel, and are found, therefore, on the coalfields. The chief centres for *glass* are *St. Helens*, *Newcastle*, and the *Tyne ports*. The home of the *potteries* is North Staffordshire, but Worcester and Derby are noted for their *porcelain*, and *Stourbridge* for its *stoneware*.

Glass requires silica, salt, and coal, and where these occur together the material can be profitably made. In addition to *St. Helens* and the *Tyne ports*, glass bottles are manufactured at *Doncaster* and *Rotherham*, and other glass goods at *Birmingham*, *Stourbridge*, and *Glasgow*.

Pottery was originally made in *North Staffordshire* because of the rich deposits of clay found in addition to the coal. This finer clay has now been exhausted, and large quantities are now brought by water from Cornwall and Devon, and imported through the Trent and Mersey Canal. *Stoke* is the chief pottery town. *Stourbridge*, on the Worcester side of the Black Country, manufactures glazed earthenware tiles, drain pipes, etc.

Boots and Gloves.

Boots are manufactured in the cattle pasture areas of Staffordshire, Leicestershire, and Northampton, the chief towns engaged being *Stafford*, *Leicester*, *Northampton*, *Wellingborough*, and *Kettering*.

Gloves are made in the sheep-rearing districts of Oxford, Worcester, Hereford, and Somerset. *Taunton*, *Yeovil*, *Worcester*, and *Hereford* all manufacture the article largely.

Brewing and Distilling.

Beer is brewed at *Burton* because of the barley grown in the district and the gypsum

found in the waters of the Trent. Brewing is also carried on at *London*, *Dublin* (stout), and *Edinburgh*.

Whisky is distilled in the barley districts of Scotland, *Campbeltown*, on the Kintyre Peninsula, being one of the chief towns. Ireland also distils whisky in the *Dublin* district.

The juice of apples is converted into *cider* in Devonshire, Somerset, and Worcestershire.

Manufactures of Lesser Importance.

Chairs, depending upon the beech forests in the Thames basin, are made chiefly at *High Wycombe*.

Paper, dependent upon supplies of pure water, is made in Kent, Derbyshire, and Midlothian, in addition to *Bacup* already mentioned (*see Cotton Industry*).

Chemicals.—As common salt is the chief material used in the manufacture of alkali, this industry is carried on near the salt yielding districts. *Widnes* is the most important town, but works are found in the *basins of the Weaver* (Cheshire) and of the *Tees*.

Straw plait, made from wheat straw and converted into hats, baskets, etc., was once an important industry at *Luton* and other towns in Bedfordshire, but is now declining.

EXERCISES.

1. Name the coalfields (1) situated on the coast, (2) those within easy access of the coast, (3) those far removed from the coast. In each case state the chief industries carried on and the reasons for them.
2. Draw a map showing the chief woollen manufacturing areas of Great Britain. In each area give the position of the chief towns.
3. Draw a map showing the chief iron producing districts of Great Britain, giving the position of the chief towns in each case.
4. What are the manufactures of Witney, Burton, Luton, Kettering, Darwen, and Ipswich? What are the geographical conditions upon which each manufacture depends?
5. Where is salt found in Great Britain? How is it obtained? What industries depend upon these salt areas?
6. Until modern times the north of England was thinly peopled. To-day it con-

tains the centres of dense populations. Account for this.

Routes of the British Isles.

The direction taken by the main roads and great railways is largely determined by the physical features. Natural gaps in the mountains and hills are used where possible in order to cross the higher land. River valleys and plains offer the least obstacle to the construction of railways.

Surrounding the Thames basin is a wall of chalk ridges, and all the railways radiating from London (with the exception of the Great Eastern Railway) have to cross these ridges. This they do by natural gaps in the chalk.

The Great Northern Railway cuts the ridge at Hitchin.

The Midland Railway at Luton.

The Great Central Railway at Aylesbury.

The London and North-Western Railway at Berkhamstead.

The Great Western Railway (old route) through the Thames Gap between Reading and Didcot.

The Great Western Railway (new routes) (1) at High Wycombe, and (2) near Devizes.

The London and South-Western Railway at Salisbury (river Avon), Winchester (river Itchen), Basingstoke, and Guildford (river Wey).

The London, Brighton, and South Coast Railway at Dorking and Redhill.

The South-Eastern and Chatham Railway at Sevenoaks, Maidstone and Ashford.

The East Coast Route into Scotland.—The Great Northern Railway, after crossing the chalk at Hitchin, runs north to the Fens, crossing the Nen at Peterborough and the Witham at Grantham, and joining the Trent at Newark. Following the lower course of the Trent it enters the Vale of York at Doncaster, and is continued past York to Darlington at its north end. From Darlington the railway follows the coast plain east of the Pennines to Berwick, through Durham and Newcastle. From Berwick to Dunbar it follows the coast, and then turns inland to Edinburgh.

The Midland Railway to Carlisle for Scot-

land.—After crossing the chalk ridge at Luton the rail crosses the Nen and enters the Soar valley at Leicester, proceeding to Derby, at the southern extremity of the Pennines. The line branches here, one route going west to Manchester and the cotton towns, the other east to Sheffield and Leeds. From Leeds the railway follows the Aire Gap, crosses the Upper Ribble to Shap Fell, and thence into the Eden valley to Carlisle.

The Great Central Railway, after crossing the chalk at Aylesbury, follows a line almost parallel with that of the Midland to Sheffield. From the latter it sends branches to Manchester and the cotton towns, Leeds and the Yorkshire towns, and to Grimsby for the new port of Immingham.

The London and North-Western Railway, after crossing the chalk ridge, runs to Rugby (an important junction), then *viâ* Stafford (with a branch line to Birmingham) through the Midland Gate to Crewe, where a branch runs along the north coast of Wales to Holyhead, the packet station for Ireland. North of Crewe the line follows the Lancashire Plain *viâ* Preston to Lancaster, then *viâ* the Lune and Eden valleys to Carlisle.

Great Western Routes (Main Lines).—This railway follows the Thames valley, and, after leaving the Thames Gap, branches at Didcot, sending one line north *viâ* Birmingham to Birkenhead and Liverpool, the other *viâ* Swindon, Bath, and Bristol through the Severn Tunnel to South Wales. At Bristol a line turns through the Vale of Taunton to Exeter, the other along the south coast of Dartmoor to Plymouth. From Plymouth the line winds through the valleys of Cornwall to Penzance.

In order to shorten two of their routes the Great Western Railway have constructed two new lines:

- (1) *Viâ* High Wycombe to Birmingham instead of through the Thames Gap.
- (2) *Viâ* Devizes to Exeter instead of through the Thames Gap.

The London and South-Western Railway, after crossing the chalk ridges at Basingstoke and Salisbury, runs to Exeter *viâ* Yeovil, and is continued along the north and west sides of Dartmoor *viâ* Tavistock to Plymouth and the far south-west. Another line, cutting the chalk at Win-



chester (river Itchen), runs to Southampton, Bournemouth, Poole, and Weymouth; and a third, cutting the chalk at Guildford (river Wey), runs to Portsmouth.

The London, Brighton, and South Coast Railway has two main routes. The first cuts the chalk at Dorking, (river Mole), crosses the Weald, and cuts the South Downs at Arundel (river Arun), and then runs to Portsmouth. The second cuts the North Downs at Redhill, crosses the Weald, and cuts the South Downs to Brighton and other South Coast watering places. A branch *via* Lewes (river Ouse), cuts through the South Downs to Newhaven, Eastbourne, and Hastings.

The South-Eastern and Chatham Railway has three main routes:—

- (1) Cutting the North Downs at Sevenoaks to Hastings, etc.
- (2) Cutting the North Downs at Maidstone (river Medway), and then following the foot of the North Downs to Folkestone and Dover.
- (3) Along the north side of the North Downs to Margate, Ramsgate, etc., and sending a branch through Canterbury and Ashford (river Stour) to Dover.

The Great Eastern Railway has two main lines of routes, neither of which has any natural obstacle to cross:—

- (1) *Via* Colchester, Ipswich, and Norwich to towns on the Norfolk coast, with branches to Harwich (packet station for the Continent) and other East Coast towns.
- (2) *Via* Cambridge and Ely to Norwich.

Routes of Scotland.

Routes of the Southern Uplands.

The Waverley Route from Carlisle uses the valley of the Liddel Water, then crosses the Teviot at Hawick and the Tweed at Melrose, and follows the Gala Water (Galashiels) between the Lammermuirs and Moorfoots to Edinburgh.

The Caledonian Route from Carlisle travels up the Annan valley, thence to Carstairs, sending one branch north along the north foot of the Pentland Hills to Edinburgh, and another branch along the Clyde to Glasgow.

The Glasgow and South Western Route crosses from Carlisle to Dumfries, follows the valley of the Nith on to Kilmarnock, and from thence to Glasgow. A route also to Stranraer follows the west coast *via* Paisley, Troon and Ayr.

The Route from Dumfries to Stranraer for Ireland follows the coastal plain bordering the north side of the Solway Firth.

The route from Berwick to Edinburgh has already been mentioned.

Routes of the Central Plain.—The ease with which railways joining the narrow belt of land between the Forth and the Clyde can be built, and the numerous centres of dense population to be connected, have caused a network of railways to be constructed.

Glasgow and Edinburgh are connected by rail, the *Caledonian* line passing through Holytown, and the *North British* having one line passing through Falkirk and another *via* Bathgate and Airdrie. The *Caledonian* has also numerous branches connecting the manufacturing towns of the Clyde Basin with Glasgow.

Routes of the Highlands.—The direction of these has been determined by the natural features.

The Coast Route from Dundee to Inverness, *via* Aberdeen, follows for the most part the coastal plain.

The *North British Railway* between Dundee and Edinburgh has been made possible by the construction of bridges across both the Tay and Forth estuaries.

Another route from either Edinburgh or Glasgow passes through the Tay Gap at Perth, and follows the Tay and Garry valleys *via* Pitlochry and Blair Atholl. From the end of the latter it passes into the valley of the Spey and thence to Inverness.

A route from either Glasgow or Edinburgh to the Western Highlands passes through the Forth Gap at Stirling, using the valley of that river to Callander, and then crossing to the west coast at Oban.

From Glasgow and Dumbarton the *West Highland Railway* crosses the previous line at Crianlarich, and rounding the northern base of Ben Nevis reaches Fort William at the southern end of the Caledonian Canal. This railway is also continued northward to Mallaig (the packet station for Skye and the Hebrides).

The Highland Railway Route from Inverness to Wick and Thurso follows the coastal sill, a branch crossing from Dingwall to Strone Ferry, a port on the west coast.

Routes of Ireland.

Railways in Ireland are easy of construction because the centre is a plain, while the low lands between the Coastal Highlands allow of easy access to the coast. The following are the chief routes:—

The Great Southern and Western Railway.—

Dublin to Kildare, Maryborough, and Mallow, along the northern edge of the Southern Highlands. At Mallow the railway passes through a gap in the hills to Cork, and is continued to the south-west. Branches of this railway run from Kildare to Wexford, Maryborough to Waterford, and Tipperary to Limerick.

A more southerly route runs from Wexford and Waterford to Limerick.

The Midland Great Western Railway Route crossing the Central Plain runs from Dublin to Galway *via* Mullingar and Athlone.

The Great Northern Route joining Dublin to Belfast follows the east coast *via* Drogheda and Dundalk.

The Northern Counties Railway from Belfast runs to Londonderry *via* Antrim and Coleraine.

EXERCISES.

1. Draw a map of South England. Mark in the chief packet stations to France, and show the railway routes joining them to London.
2. Draw a map of the Irish Sea, and insert the chief steamship lines connecting Great Britain to Ireland. Describe the railway route connecting one of these packet stations to London.
3. Give reasons why Perth, Inverness, and Stirling were such important towns in the past history of Scotland.
4. Draw a map of the North Sea and insert the chief steamship routes connecting the east coast with the Continent.
5. Describe one of the main lines from London to Edinburgh, naming the chief physical features traversed, and the position of the most important stations on the route chosen.
6. Show how far the railway route from London to Plymouth uses the path of least resistance.

Canals.

These can only be constructed where the land is not elevated. They are mostly used

to connect rivers, and thus make it possible to send goods by water. This, although slower, is much cheaper than carriage by rail.

The chief *English Canals* are:—

The *Leeds and Liverpool Canal*, which uses the low Aire Gap to cross the Pennines.

The *Manchester Ship Canal*, which allows the cotton from the Atlantic to be brought into the Manchester cotton market, without being first unshipped at Liverpool.

The *Trent* is joined to the *Mersey*, *via* Stoke.

The *Trent* is joined to the *Thames*, *via* Leicester and Northampton, and also *via* Birmingham and Oxford.

The *Thames* is joined to the *Severn*, *via* Oxford and Stroud, and again *via* Reading and Bristol.

Scottish Canals.

The *Caledonian Canal*, from Inverness to Fort William, is cut through the Glenmore valley, and shortens the tourist steamer route from the east to the west coast.

The *Forth and Clyde* are joined by a canal which runs from Grangemouth to Bowling, through Falkirk. This, passing through the manufacturing districts of Scotland, forms an important waterway.

The *Crinan Canal* cuts the northern end of the Kintyre Peninsula, and makes a shorter passage for tourist steamers from the Clyde to the open ocean.

Irish Canals.

This country allows of easy canal construction. The two chief are the *Grand* and the *Royal*, both connecting Dublin to the Shannon.

Route Towns.

In past ages, when the British Isles were mainly pastoral and agricultural, the chief towns were market centres for trade and exchange. These sprang up where the natural features caused a convergence of routes, and similar positions are to-day occupied by the important railway towns.

Gap Towns.—Where a river has made a gap in a ridge, the roads on either side will naturally converge on this gap, in order to allow a passage across the hills. Towns naturally arise at such places, and examples of these are *Canterbury*

and *Ashford* (the Stour Gap); *Maidstone*, *Rochester*, *Chatham* (the Medway Gap); *Sevenoaks* (the Darent Gap); *Lewes* (the Ouse Gap). *Chichester* and *Arundel* (the Arun Gap); *Winchester* (the Itchen Gap); and *Bath* (Avon Gap). These became the chief market towns or else ecclesiastical centres in the south of England.

Lincoln (the Witham Gap), *Perth* (the Tay Gap), *Stirling* (the Forth Gap), and *Dumbarton* (the Clyde Gap), are similar towns farther north.

Carlisle and *Berwick* are important as gateways into Scotland, where the routes converge to pass round the west and east sides of the Cheviots.

Doncaster and *Darlington* stand at either end of the Vale of York, and therefore are important railway towns, while *York*, built on a hill in the centre, has been noted since Roman times.

Inverness and *Fort William* stand at either end of the Glenmore valley.

Chester, at the mouth of the Dee, on the west side of the Midland Gate, was the meeting place of important roads. Its position in railway importance is now taken by *Crewe*, from which the London and North-Western Railway branches after passing through the gap. This town has extensive railway works.

Derby, at the foot of the Pennines where the Midland Railway branches to the north-east and north-west, has also important railway works.

Rugby is an important junction, where the rivers of the Wash, the Cherwell, Warwick Avon, and Soar nearly meet, causing a convergence of routes.

Inverness is the route and commercial centre of the Highlands. Standing at the north-eastern end of the Glenmore valley, where the railways from the south northward cross the natural route through the valley, it is within easy access of west, south, and north, and its proximity to the agricultural lands of the Moray Basin gives it a distilling industry. *Fort William*, at the western end of the rift, has a similar importance, being both a railway and road junction.

Aberdeen, on the estuary of the Dee and near that of the Don, owes its importance not only to the export of the produce of these valleys but to its position on the coast, which causes it to be the centre of the Scottish fishing industry. The convergence of railways causes it to be a

railway junction, while its position opposite the entrance to the Baltic enables it to import flax for its linen and sailcloth.

Callander is the tourist centre for the Trossachs, and *Crianlarich* is an important junction where the West Highland Railway crosses that from Callander to Oban.

Oban is the tourist centre for the West Highlands at the coast terminus of the most important route. It is also a steamship centre, from which coasting vessels leave for the Firth of Clyde, the Firth of Lorne, the Caledonian Canal, and the ports of the Outer and Inner Hebrides. *Strone Ferry* and *Mallaig* have a similar importance.

Edinburgh, the political capital of Scotland, stands at the eastern gateway of the Central Plain. The east coast route, the routes from Carlisle across the Southern Uplands, and the routes from Glasgow and the towns of the Central Plain, all converge on Edinburgh, while railways connect the city with Perth (by the Forth Bridge), and Stirling, the gateways of the north.

Stirling, on a fortified rock, guards the central gateway to the Highlands, where the Forth makes a gap between the Ochils and Campsie Fells. It is a busy manufacturing town in addition to being a railway junction and an agricultural centre.

Perth guards the eastern gateway to the Highlands between the Ochils and Sidlaw Hills. The natural convergence of routes at the limit of navigation of the Tay caused it in past ages to be the capital of Scotland. Notice on the Map the railways which meet at Perth.

The Army Centres of Aldershot and Colchester are important, because from them troops could be moved to guard London in case of invasion. They also possess easy access to the coast should troops be required for foreign service.

York and *Edinburgh* are smaller centres in the north, and the large available area on *Salisbury Plain* forms a suitable site for army manœuvres. *Curragh Camp*, near to the important junction of Kildare, has easy access to all parts of Ireland.

Commerce.

A very large number of causes have contributed to the commercial pre-eminence of

the British Isles, but the geographical position as the centre of the land hemisphere of the globe, the nearness to the highly developed continent of Europe, the large length of coast line per unit area of surface, the good internal means of transport, the abundance of mineral wealth, and the favourable climatic conditions are the most important.

The British Isles have approximately 1 mile of coast to 19 square miles of area. This indicates that the coast is highly indented, arms of the sea penetrating well inland, giving important commercial and climatic advantages. The positions of the estuaries of the *Thames*, *Humber*, *Forth*, *Tay*, *Clyde*, *Mersey*, *Severn*, and *Shannon* should be carefully noted. These openings have in most cases become important commercial highways.

The south coast of England possesses a large number of good harbours, such as *Southampton*, *Portsmouth*, and *Plymouth*, but their great defect is faulty natural communication inland. The physical hindrances to transport have, however, been overcome by engineers in recent years.

In connection with the coast, the depth of the neighbouring seas and the nature of the tides and currents are very important. The situation on the continental shelf of Europe makes the surrounding seas shallow, and this gives an increased depth to the tides, the amplitude of the tidal wave becoming greater in shallow water. This is a great advantage to our commerce.

There is a difference of 60 feet at spring tides between high and low water at many places off our coast. Off parts of the west coast there is an average difference of about 35 feet between high and low water. A large number of ports have a depth of 25 feet at high water.

Southampton has four tides a day due to two separate branches of the tidal wave passing through the *Solent* and *Spithead*. The second wave reaches the port about two hours after the first.

The *Severn* estuary and *Solway Firth* have tidal bores, and *Pentland Firth* has a tidal race.

The British coasts are particularly free from dangerous currents.

Owing to our favourable climate, labour is possible throughout the whole year, the textile industries flourish, and our water

highways and harbours are never frozen in winter. Our commerce is consequently uninterrupted.

The vast supplies of mineral wealth, particularly in England and the Clyde basin of Scotland, have led to the development of a great manufacturing industry. A specially important point to be noted in this respect is the nearness of the mineral wealth and consequently the manufacturing centre to the great ports.

The cotton industry of *Lancashire* is on the *Mersey* banks near *Liverpool*, the best possible position for the Atlantic trade in raw material and manufactured products.

The *Humber* and the rivers it receives form important routes into the heart of the woollen area of Yorkshire and the northern part of the Black Country.

The *Clyde* flows through the centre of the great industrial area of Lanarkshire.

The *Tyne*, *Tees*, *Severn*, *Forth*, *Tay*, and *Lagan* also flow through important manufacturing districts.

The internal lines of communication have already been described (*see* Routes).

Other important causes which have been favourable to our commerce are the efficiency of British labour, the improvements in machinery by mechanical inventions, and the great extent of our shipping industry.

Recent returns show that over 21,000 vessels belong to the United Kingdom and that over 50 per cent. of the world's shipping is British.

The order of the chief ports with regard to tonnage of shipping is: *London*, *Cardiff*, *Liverpool*, *Tyne Ports*, *Southampton*, *Hull*, *Glasgow*, *Newport*, *Blyth*, *Dover*, *Plymouth*, *Swansea*, *Sunderland*, *Middlesbro'*, *Grimsby*, *Leith*, *Manchester*.

Seaports.

Modern seaports are found where nature has provided some outlet to the sea from a productive region inland. The chief seaports of the British Isles are London, Liverpool, Glasgow, Belfast, Newcastle, Cardiff, Hull, Southampton and Bristol.

London, the bridge port of the *Thames*, has high tides, enabling ocean-going steamers to come up to London Bridge. The natural slope of England to the south-east causes a convergence of routes

Map 25.



BRITISH ISLES—COUNTIES.

opposite to the most important outlets of the Continent. Hence, London forms a collecting and distributing centre for all parts. Its great drawback is its want of coal and iron. The Port of London reaches nearly to the mouth of the river, the largest liners landing at Tilbury Docks. The chief routes from London are shown on Map 24.

Liverpool has shipping trade exceeding that of London. Standing at the mouth of the Mersey, it is the outlet of the manufacturing areas of Lancashire, and it looks towards North America, from whence it imports largely grain, cattle, and raw cotton. It has also much passenger traffic with that continent, and trades with Ireland in dairy produce. *Birkenhead* and *Bootle* are similarly engaged.

Glasgow, including *Port Glasgow* and *Greenock*, has an artificial harbour, but its position on a rich coalfield, and as the outlet of the densely peopled plain of Scotland, gives it an important trade. The coal and iron have transformed the Clyde into a great shipbuilding yard. The routes from Glasgow are shown on Map 24.

Belfast, on a sheltered estuary, not only exports the linen manufactured in this region, but its rich ironfield, its good harbour, and its proximity to the Ayrshire coal have made it a great shipbuilding centre.

Newcastle and the Tyne ports of *Tynemouth*, *North Shields*, *Gateshead*, and *Jarrow* have, in addition to a large coasting trade in coal, an extensive shipbuilding and engineering industry.

Cardiff has gained its importance during recent years, owing to the export of coal from the South Wales coalfield. This port sends out more coal than any other in the world.

Hull, on the Humber estuary, and connected by rail inland, exports chiefly the products of the Ouse and Trent basins. Its position opposite to the Kiel Canal gives it a large trade with Germany and the Baltic. It also imports much raw wool from Australia.

Immingham, on the south side of the Humber, near Grimsby, has a newly constructed harbour, with the latest appliances for coaling ships. It may in future rival Hull in importance.

Southampton, on Southampton Water, has a deep estuary, and an immense mail and passenger traffic with South Africa, India,

and the Far East, in addition to an increasing trade with America. Much of the importance of Southampton is due to the easy communication with London.

Bristol, at the outlet of the Bristol Avon into the Bristol Channel, has a decreasing trade with America. It now trades largely with the West Indies, and imports a quantity of dairy produce from Ireland.

Plymouth has an importance similar to that of Southampton.

Middlesborough is the outlet of the Cleveland coalfield.

Sunderland, at the mouth of the Wear, has trade similar to that of Newcastle.

Swansea exports the copper, coal, and iron of South Wales.

Manchester has ranked as a port since the opening of the Ship Canal.

Leith is the port for Edinburgh.

Dundee imports flax from the Baltic.

Ayr exports the coal of the interior.

Ireland has no good harbours on the eastern coast. *Dublin* possesses an artificial one at *Kingstown*. On the west are numerous fine rock harbours, but these, facing the Atlantic, and being the outlets of a poor interior, are useless for purposes of trade. In the south, *Cork*, *Waterford*, and *Wexford* are the outlets for dairy produce. *Cork* possesses good railway communication with Dublin, and has a commodious harbour, containing the island on which *Queenstown* is situated. This latter is a calling-place for vessels to America.

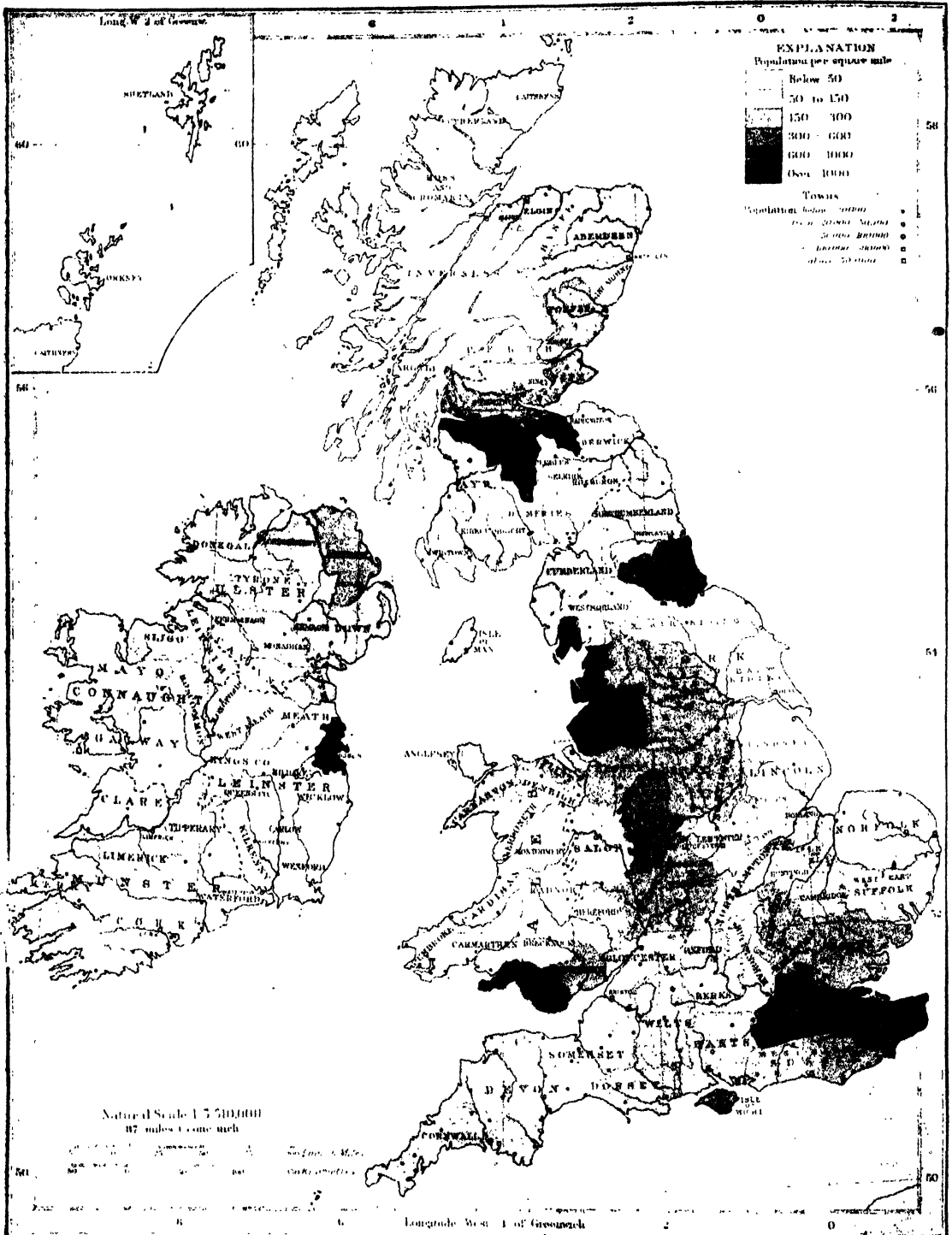
Naval Stations.

Dover at the eastern end, *Portsmouth* in the centre, and *Devonport* and *Falmouth* at the western end, are stations guarding the English Channel. *Rocheester*, *Chatham*, *Sheerness* and *Shoeburyness* are connected with the defence of London, while *Harwich*, on the north of Essex, and *Rosyth*, in the Firth of Forth, are naval bases on the North Sea. *Pembroke* is an important station in the west.

Imports and Exports.

The great magnitude of British commerce is shown in recent returns, where the imports value about £769,000,000 and the exports £635,000,000. The average share per head

Map 26.



BRITISH ISLES—DENSITY OF POPULATION.

of population is given as £16 for imports and £14 for exports. Our commerce embraces the whole world, but the chief countries with which we trade are as follows in order of importance: *United States, Germany, India, Russia, France, Australia, Argentine, Canada, Egypt, Belgium, Denmark, Netherlands, New Zealand, Spain, Straits Settlements, Sweden, and South Africa.*

4. Account for the great importance of London as a port.
5. In what respects do the tides affect commerce.
6. Name the chief imported foodstuffs and the countries from which they are derived.
7. Say what you can of the value of the British river estuaries of commerce.

Counties—Density of Population.

The counties are divisions of the country for purposes of local government. In England and Southern Scotland the land was settled by different invading races from the shores of Europe opposite, and the boundary between the counties was often formed by some natural features presenting an obstacle to further movement, *e.g.*, the *Pennines* divide the counties of the north-west from those of the north-east, while the *Thames* forms the boundary between Buckingham and Berkshire, Middlesex and Surrey, Essex and Kent.

The population is not evenly distributed throughout the British Isles. With the exception of the area round London the dense populations are all on the great coal-fields, where manufactures employ a large number of skilled and unskilled workers. The mountainous, hilly and pastoral districts only support a sparse population.

The growth of manufactures has altered the population map of the British Isles. Before the development of steam power, the areas containing the greatest populations were the agricultural lands of the south and east, the north being then occupied by poor pastoral people. Manufactures caused the rise of great centres of population in the North and Midlands of England.

Chief Exports.		Chief Imports.	
Cotton goods .	£126,000,000	Raw cotton	£71,000,000
Iron manufactures .	54,000,000	Wheat .	44,000,000
Coal .	51,000,000	Wool .	34,000,000
Woollen goods	26,000,000	Timber .	33,000,000
Chemicals and drugs .	22,000,000	Butter .	24,000,000
Apparel .	17,000,000	Sugar .	23,000,000
Cotton yarn .	15,000,000	Rubber .	21,000,000
Fish .	8,000,000	Beef .	19,000,000
Linen goods .	6,000,000	Bacon .	17,000,000
		Fruits .	16,000,000
		Maize .	14,000,000
		Tea .	14,000,000
		Oil seeds .	12,000,000
		Mutton .	11,000,000
		Petroleum .	11,000,000
		Leather .	10,000,000
		Eggs .	9,000,000
		Tin .	9,000,000
		Tobacco .	8,000,000
		Barley .	8,000,000
		Iron ore .	7,000,000
		Cheese .	7,000,000
		Motor cars	7,000,000
		Oats .	6,000,000
		Wine .	4,000,000

EXERCISES.

1. Write an account of the value of raw materials to British commerce.
2. Name the chief Scottish seaports and discuss their relative values.
3. Show how the chief English seaports are placed with regard to the great industrial centres of the country.

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER IV.

EUROPE.

CONTENTS.

World Position—Seas, Coasts—Islands.
Surface.
Climate.
Vegetation and Animals—Fisheries.
Minerals—Manufactures.
Routes—Canals—Route Towns.
Commerce and Seaports.

MAPS.

27 to 30. Climatic Maps.
31. Animals.
32. Vegetation.
33. Minerals and Iron Manufactures.
34. Manufactures and Seaports.
35. Routes.
36. Population.
37. Political.

World Position.

Europe stretches roughly from 35° to 70° N. latitude, that is through 35 degrees of the north temperate zone. It lies in the centre of the land hemisphere, and is separated from the new world of North and South America by the *Atlantic Ocean*, from North Africa by the *Mediterranean*, and from Asia by the *Urals* in the east and the *Caucasus* and *Black Sea* in the south-east. Europe is in reality a western peninsula attached to the great land mass of Asia, and the two continents together are often spoken of as *Eurasia*.

Advantages of this Position.

- (1) Europe possesses an equable climate, because temperate regions have neither extreme cold nor intense heat.
- (2) Being in the centre of the land hemisphere, Europe is in the best position for trade.
- (3) The Atlantic Ocean, which washes the western shores, has an equalising influence on the climate. The warm westerly winds blowing across this bring moisture, and the Gulf Stream Drift conveys warmth to the coasts (*see* Climate).

This western peninsula is not geographically a distinct land mass, but forms a separate continent because of—

- (1) Its commercial importance.
- (2) The great political power of its peoples.
- (3) The populous parts of Asia lying in the east and south of that continent are separated from Europe by arid deserts and grassy steppes.

Seas, Coasts.

Fig. 14 shows a small area unshaded, which is more than 400 miles from the sea. Europe has a longer coast line for its size than any other continent. Look carefully at the map and notice how long arms of the sea penetrate into the heart of the land, causing large peninsulas.

Influence of Long Coast Line.

- (1) The climatic influence of the sea is felt far inland.
- (2) No place is far from the sea for purposes of trade.
- (3) Many inhabitants tend to become sailors and traders in all parts of the world.
- (4) Many people become colonists and explorers.

On the west the *Baltic* (with its long arms the *Gulfs of Bothnia* and *Finland*) washes the shores of Sweden, Russia, Germany and Denmark.

The *North Sea*, narrowing to the Strait of Dover, separates Great Britain from the Continent on the east, and the *English Channel* divides it from France.

On the south the *Mediterranean*, connected

west coast of Greece are the *Ionian Islands*, and in the *Aegean Sea* are numerous rocky islets forming the *Grecian Archipelago*. *Crete* lies to the south of Greece, and *Cyprus*, at the east end of the Mediterranean, is administered by Britain.

Iceland, belonging to Denmark, lies just south of the Arctic circle, and being situated in the open Atlantic has little structural connection with Europe, although there is a submarine ridge joining it to the mainland.

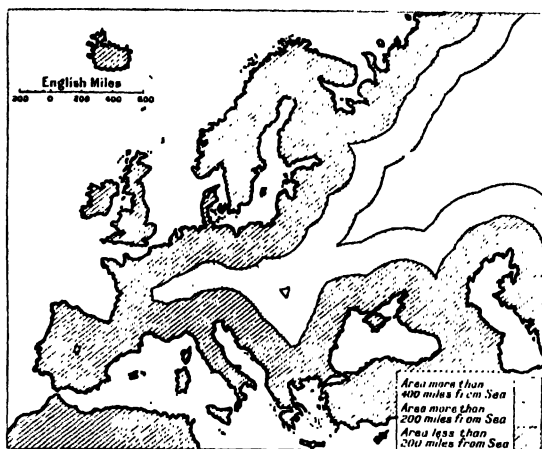


Fig. 14.

to the Atlantic by the *Strait of Gibraltar*, forms a great highway for trade.

Between the Mediterranean and Black Seas are the *Dardanelles* and *Bosphorus*, separated by the small *Sea of Marmora*. The *Black Sea* has an extension in the *Sea of Azov* in the east of the Crimea. The *Caspian*, a land-locked sea, is separated from the Black Sea by the mountainous Isthmus of Caucasia.

Islands.

The chief islands of the North Sea are the *British Isles*, which in the preceding chapter we found were situated on a continental shelf. Guarding the entrance to the Baltic are *Zealand*, *Finen*, and *Laaland*, which form part of the country of Denmark. *Corsica* and *Sardinia*, separated by the Strait of Bonifacio, are two large islands in the Western Mediterranean, and *Sicily*, at the southern end of the Italian Peninsula, is an extension of the Apennines. *Malta* and the Maltese islands, lying to the south of Sicily, guard the passage between the East and West Mediterranean. The Eastern Mediterranean is studded with small islands. Off the

EXERCISES.

1. How is the Western separated from the Eastern Mediterranean? Look at the map and see what contrasts can be drawn between them. Why is Malta important?
2. What seas wash Eastern Europe? From the map find out the disadvantages of the sea coast of Russia.
3. Name the entrances to the Baltic, Mediterranean, and Black Seas. What important towns guard these entrances?
4. What seas wash the shores of France? Show how each of these gives her an advantage for trade.

Europe—Surface.

The build of Europe may be summarised as follows:—

1. *A Mountain Axis* or backbone, commencing in Cape Finisterre in the western extremity of the Cantabrians and continued through the Pyrenees, reappearing on the other side of the Rhone Valley as the Alps. The Apennines, forming the backbone of Italy, are a southern extension of these. The Alps are continued by the Carpathians and Balkans, and the axis is connected to the mountains of Asia through the Caucasus.
2. *The Northern Highlands* continue the south-west to north-east direction of the Scottish Highlands.

The Scandinavian Mountains.—The steep western slope of this peninsula is cut into by deep fiords, with lofty mountain walls on either side. The detached mountain fragments form a chain of islands known as the *Skerry Guard*, which, breaking the force of the Atlantic waves, cause calm channels between them and the mainland. On the east there is a gradual descent by terraces

to the Baltic. The longer rivers drain this slope, and in the lower south-east of the peninsula are the Lakes Wener, Wetter, and Mälär.

Comparison between the Highlands of Scotland and Scandinavia.

- (1) Both have their steep slope to the west, and their gradual

widening out in the east to include the whole of Russia, is a great plain broken by hill systems. This plain resembles in structure the southern part of the British Isles. The mountains of Wales, Cornwall, and South-West Ireland are continued by a belt of higher ground on the north side of the mountain axis, stretching from the peninsula of Brittany through the Central Plateau of

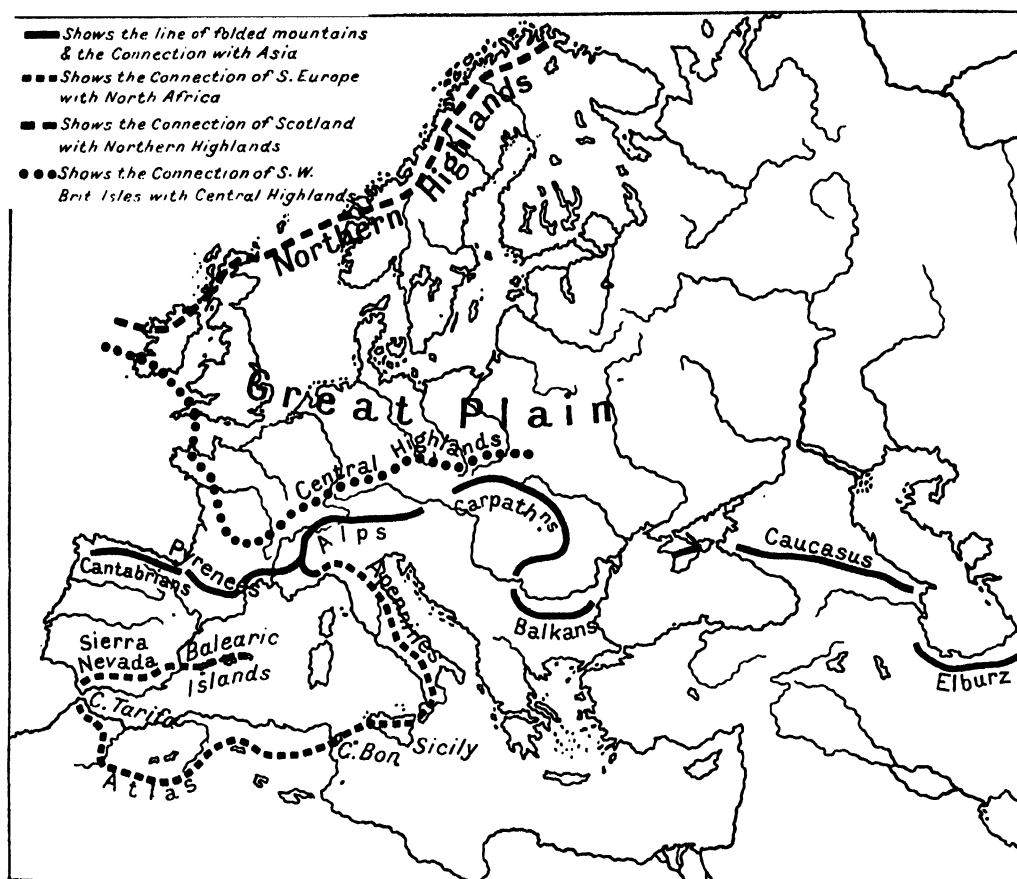


Fig. 15.

slope with large rivers draining to the east.

- (2) The western slope of both is towards the Atlantic Ocean, and is cut into by long fiords, with chains of islands fringing the coasts.
- (3) Both contain large masses of granite in their structure.

3. *The Great Plain.*—Between 1 and 2, stretching from France in the west and

France, and continued by the Vosges and Black Forest and the hill systems of Southern Germany.

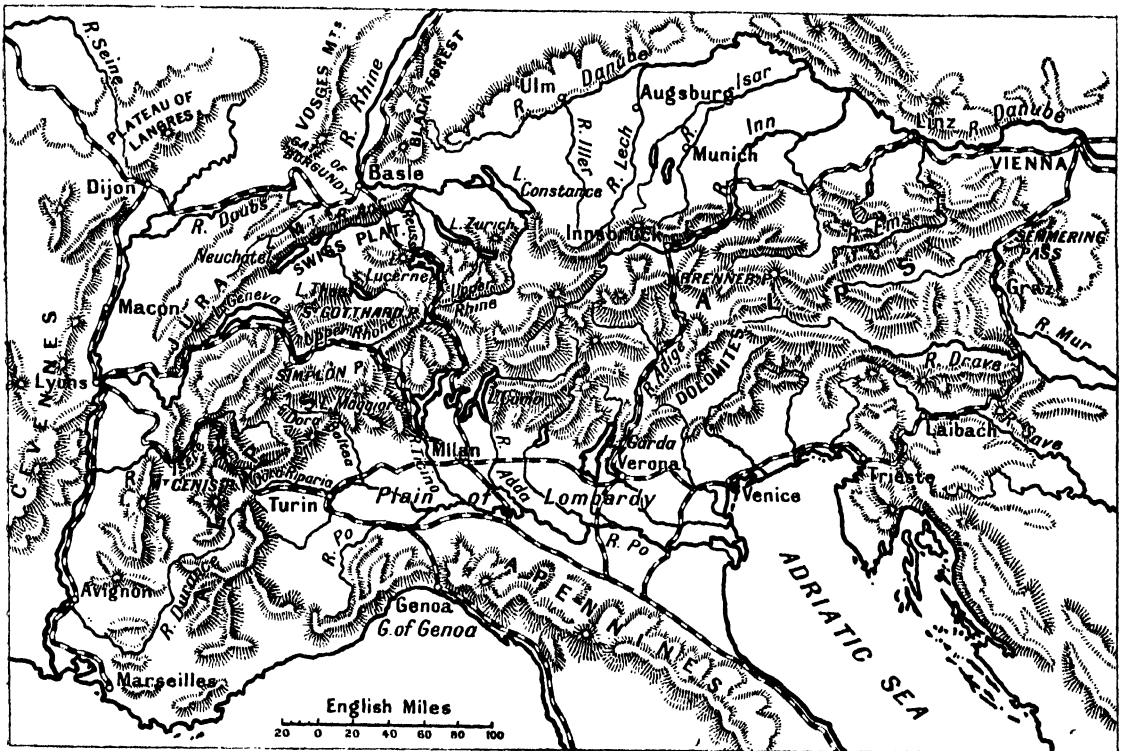
The western half of the plain has a gradual slope, with long, navigable rivers to the north-west. In the east the rivers flow from the Valdai Hills, which form a water-parting in the centre. This plain is not all at one level, but is broken by undulating hills similar to those crossing the south-east plain of England.

The gradual slope of the plain to the northwest, with the navigable rivers draining it, has caused the routes to converge and trade to find an outlet along the northwest shores, opposite the coasts of the British Isles.

The Alps.

The Alps extend from the Gulf of Genoa to the Hungarian Plain and the Danube. They stretch through Italy, France, Switzerland, and Austria, and border Germany. In

The Western Alps have a gradual outer slope drained by the *Isère* and *Durance* to the *Rhone*, and an inner slope draining to the *Po*. The Central Alps slope down on the north to the Swiss plateau, and on the south to the Plain of Lombardy. From St. Gotthard the Upper Rhone flows in a south-westerly direction through Lake Geneva to join the Saône at Lyons. Rising in the same region, but flowing north-east, is the *Rhine*, which breaks through the mountains at *Lake Constance*. Between Lakes Con-



across Germany to the Upper Danube, drained by the *Isar* and *Inn*. The valleys opening to the Hungarian Plain in the east are drained by the *Drave* and *Save*, tributaries of the Middle Danube.

The rivers in many cases cut transverse valleys through the mountain ranges, and where these are connected by low passes or cols, routes are possible across the Alps (see Routes).

Vegetation.

The word Alps means summer pastures, and below the line of perpetual snow are found grass lands which in summer feed quantities of cattle, sheep, and goats. In these high lands are hotels open only during the summer months, when they are frequented by tourists, who have caused the Alps to be called the *Playground of Europe*. Below the summer pastures are forests of coniferous or cone-bearing trees, succeeded farther down by deciduous trees, shedding their leaves each year. Lower still are agricultural lands, and fruits requiring a sheltered climate can be grown in the valleys.

The Carpathians and Mountains of South-Eastern Europe.

The great bend of the *Carpathians*, which encloses the *Hungarian Plain*, continues the mountain fold. These form a broad range only half the height of the Alps and forested to their summits. Their southern continuation, known as the *Transylvanian Alps*, approaches the *Danube* at the *Iron Gate*, and beyond that river the fold is continued by the *Balkans*. The inner slope of the *Carpathians* is drained to the *Danube*, the *Oder* and *Vistula* on the outer slope flow north to the Baltic, and the *Dniester* drains to the Black Sea.

The limestone ridges of the Alps are continued along the shore of the Adriatic as the *Dalmatian Alps*, and an extension of these forms the *Albanian Mountains* and *Pindus Range* in Greece. Between this limestone ridge and the *Balkans* is an older sandstone plateau which sends out a south-west spur known as the *Rhodopes*. The southern continuation of the Alps, the plateau surface, the *Balkans*, and the valleys between, form the *Balkan Peninsula*.

The Danube.

This is an Alpine river, because most of its tributaries, and therefore the greater part of its volume of water, are derived from the Alps. Its source is on the slope of the Black Forest, and it is separated from the Rhine by that ridge. The Upper Danube receives from the Alps several tributaries, of which the chief are the *Isar* and *Inn*, the latter forming the boundary of Austria. Where the Bohemian Forest comes south to meet the Alps the *Austrian Gate* at *Linz* is formed. Again, at *Pressburg* the Alps meet the *Carpathians* to form the *Carpathian Gate*. Between these two gates is the Austrian Plain, with *Vienna* in the centre. The *March* or *Morava* flows from the *Moravian Gate* in the north-east to join the river near *Pressburg*. The *Carpathians* meet the Alps again at the *Hungarian Gate*. East of the *Hungarian Gate* the river flows south across the Great Hungarian Plain, receiving the *Drave* and *Save* from the Eastern Alps, and the *Theiss*, draining the inner curve of the *Carpathians*. The river then passes through the *Iron Gate*, a gorge between the *Transylvanian Alps* and the *Balkans*, and then flows between *Rumania* and *Bulgaria*, forming a delta on the Black Sea.

The Apennines.

These form a southern extension of the Alps through the Italian Peninsula. From the Gulf of *Genoa* the range trends to the east coast, where it reaches its highest point in *Gran Sasso*. Here it turns south and runs to the "toe" of Italy, and is continued on the other side of the Strait of *Messina* into *Sicily*.

In the north-east are the *Tuscan Highlands*, extinct volcanoes; but in the south *Vesuvius* near *Naples*, *Etna* in *Sicily*, and *Stromboli* in the *Lipari Isles*, are still active.

The River Po.

Between the Alps and the Apennines is the *Plain of Lombardy*, drained by the *Po*. The vast amount of alluvium brought down by the Alpine tributaries from the southern slope of the Alps has caused the river to raise its bed, and embankments have to be built to keep the water within its course. This same alluvium has made the *Plain of Lombardy* very

fertile. The Po is also carrying so much material out to sea that it is rapidly extending its delta seawards.

France—Surface.

The Western Alps drain to the *Rhone Valley*, on the other side of which rises the steep edge of the Central Plateau of France known as the *Cevennes*. This plateau, which occupies a great part of France, has a gradual slope to the north and west, and is drained by the *Dordogne* and the *Loire*. It is broadest in the south, where it is separated from the Pyrenees by a narrow plain known as *Carcassone Gap*. In the north it narrows, and is continued to the *Vosges* and *Ardennes* in the north-west.

The Central Plateau of France is a poor, thinly populated region separating the rich scarplands of the north-west, drained by the Seine, from the rich Rhone Basin in the south-east and the plains of Aquitaine in the south-west.

Communication is possible between—

- (1) The Plain of Aquitaine and the Saône-Rhone Basin through the *Carcassone Gap*.
- (2) The Plain of Aquitaine and the Seine Basin by the *Gate of Poitiers*, lying between the mountains of Brittany and the Plateau.
- (3) The Seine and Saône-Rhone Basins by the narrow, low *Plateau of Langres*.

South of the Gironde mouth is a low, flat coast where sand has been carried inland, forming a poor pasture land known as the *Landes*. To prevent further encroachments of sand, coarse grass and pines have been planted.

The Saône-Rhone.

The *Saône*, a slow-flowing tributary which meets the *Rhone* at *Lyons*, rises in the Plateau of Langres. To the east, between the Jura and Vosges, is the *Gate of Burgundy*, with the *Doubs* flowing from it to join the Saône, thus making possible through communication between the Rhine and Rhone. The Upper Rhone has already been mentioned as rising in the Alps and draining through Lake Geneva to meet the Saône at Lyons. The *Isère* and *Durance*, draining the western slope of the Alps, both flow to the Rhoné. The Rhone, draining to

a tideless sea, has a large delta, and therefore the great outlet of this valley is at *Marseilles*, situated on a rocky harbour on the coast east of the river.

The Seine.

This river with its tributaries drains all the gradual slopes of the north-east. These tributaries meet in the neighbourhood of Paris, and between that city and the river mouth at *Harre* the stream has cut a gap through the higher land to reach the English Channel.

Iberian Peninsula—Surface.

The *Pyrenees* form an almost impassable barrier between France and Spain, hence routes into Spain pass round either end of the ranges.

The *Cantabrians*, a westward continuation of the Pyrenees, form a deep wall, forested on its northern slope, where it descends to the Bay of Biscay. On the south side of these mountains is the Iberian Plateau, stretching in the south to the *Sierra Morena*. This block-tableland is crossed by parallel ranges of mountains running east and west, and between them run parallel rivers which flow in deep gorges. South of the Sierra Morena is a folded range commencing in the *Balearic Isles*, continued through the *Sierra Nevada* range, across the Strait of Gibraltar, into North Africa (*see* Surface of Africa).

There are three important plains:—

- (1) The *Plain of Arragon*, between the Pyrenees and the plateau, drained by the *Ebro*.
- (2) The *Plain of Andalusia*, between the southern edge of the plateau and the Sierra Nevada, drained by the *Guadalquivir*.
- (3) The *Lower Plain of the Tagus*, which is continued north to form a coastal sill along the west edge of the tableland.

The Plain of Europe.

The Central Plateau of France is continued by the Vosges and Ardennes to Germany and Belgium. In Germany these highlands form low, wooded hills rich in minerals, and are situated mostly in the south. The gradual north-west slope from them is drained by the *Elbe*, *Oder*, and *Vistula*, all long, navigable rivers. The *Rhine*, rising in the Alps, breaks through these central highlands, and flows in a similar direction. The *Vosges*

rise gradually from the west to a steep brink overlooking the Rhine. The *Black Forest* has a similar brink edge on the east side of the river. The *Ardenes* are continued by the *Lower Rhine Highlands* and the *Hartz Mountains*. In the south the *Bohemian Forest*, the *Ore Mountains*, and the *Sudetes* shut in the kingdom of Bohemia.

The Rhine.

The Rhine flows along the northern edge of the Swiss plateau to Basle. Between that town and *Mainz* it flows through a rich plain about 20 miles wide, bordered on either side by the steep slopes of the *Vosges* and *Black Forest*, and receiving the *Neckar* and *Main* from the east. Between *Mainz* and *Bonn* the river cuts a gorge through the *Lower Rhine Highlands*. The rich fertility of the Upper Rhine plain is replaced by forested crags which reach to the river's edge, while here and there are ruined castles, each with its own legend. *Coblenz* stands at the junction of the *Moselle* from France and the *Lahn* from the east. North of *Bonn* the river flows through the *Lower Rhine* plain with its busy manufacturing towns. The greater part of Holland is made up of the delta of the Rhine and the *Meuse*. The latter is a river rising in the north-west of France and flowing through Belgium.

The Eastern or Russian Plain.

The Great European Plain widens out in the east to form European Russia, which occupies half the area of the continent. This plain rises in the centre to the low *Valdai Hills*, which form a water-parting, causing long, navigable rivers to flow in all directions. The *Volga*, the longest river in Europe, drains to the inland *Caspian Sea*; the *Don* flows south to the *Sea of Azov*; and the *Dnieper* enters the *Black Sea* west of the Crimean Peninsula. The *Dniester* drains the outer slope of the Carpathians; the *Niemen* and *Western Dvina* flow in a north-westerly direction to the Baltic; the *Northern Dvina* and *Onega* flow to the *White Sea*; while the *Petchora* drains from the Urals to the Arctic Ocean. In the north-west is the lake district of *Finland*, which is drained to the Baltic, the waters of *Lake Onega* and *Lake Ladoga* being conducted by the *Neva* to the Gulf of Finland.

The great extent of the plain and the low watershed produce long, slow-flowing rivers, but in spring when the snows melt these often overflow their low left banks.

EXERCISES.

1. Why are the people of Norway largely engaged in fishing?
2. Draw a map showing the direction of the mountains of Southern Germany and the upper courses of the Elbe, Oder, Vistula, and March.
3. Name the Gates of the Danube. In each case state what mountains approach the river to form these gates.

Climate.

Look at Map 27, showing the Isothermal Lines for January. Notice that the west is warmer than the east, that a great part of Russia has a temperature of less than 14° F., and that Russia, Austria-Hungary, Sweden, and part of Germany have a January temperature of less than 32° F.

Contrast this map with the July Isotherm, Map 28, and notice that the difference in temperature between January and July is only between 10° and 15° in Western, while in Eastern Europe there is a difference between summer and winter of from 40° to 50° F. In the south, along the shores of the Mediterranean, note that the winter temperature is warm—about 50° F.—and that the summer temperature is hot, having an average between 70° and 80° F.

Carefully look at Maps 20 and 30, showing the January and July Rainfalls. Notice that Western Europe has a fair rainfall both in summer and winter, but most in winter. Eastern Europe has very little rain in winter, but more in summer. The Mediterranean countries have their greatest rainfall in winter, and in summer experience very little rain.

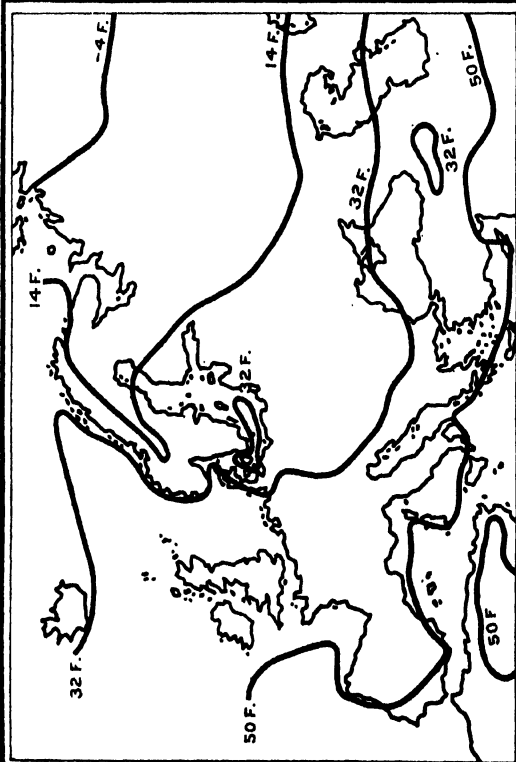
From this study of maps we can divide Europe into three climatic regions—

- (1) *Western Europe*, having an insular climate, with rain distributed throughout the year, but falling mostly in winter.
- (2) *Eastern Europe*, having great extremes of temperature, with little rain, most of which falls during the summer months.
- (3) *Southern or Mediterranean Europe*,

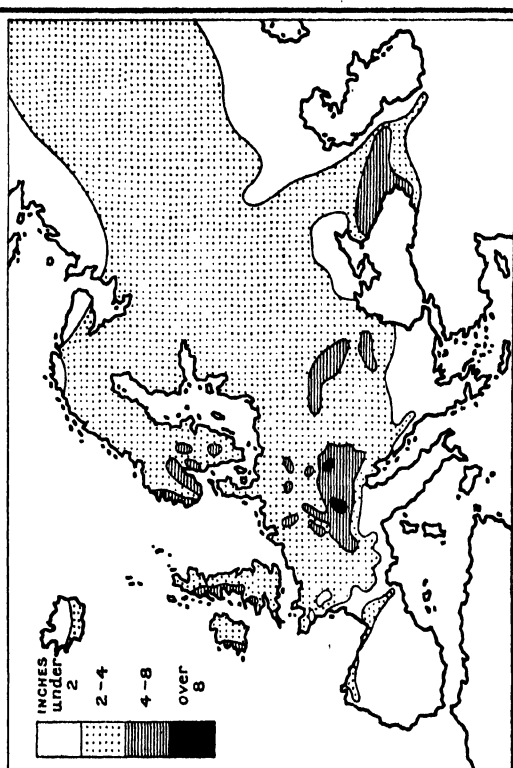
JULY ISOTHERMS.



JANUARY ISOTHERMS.



JULY RAINFALL.



JANUARY RAINFALL.



having a warm, wet winter, and a hot summer with little rainfall.

EXERCISES.

1. Contrast the climates of Norway and Sweden. Why are the Norwegian ports ice-free when those of the Baltic are frozen?
2. Name those parts of Europe having little rainfall. Give reasons in each case.
3. Name those parts of Europe which have (a) most of their rain in summer, (b) have winter rains, (c) rain at all seasons.

Vegetation and Animals.

Forests are found chiefly on the mountain slopes, where agriculture is impossible, but there is a belt stretching across Russia into Asia. *Coniferous trees* flourish in the colder north and on the higher slopes of the mountains, *deciduous trees* at a lower elevation and in lower latitudes. Along the shores of the Mediterranean *evergreen trees* are prevalent.

These forests are responsible for a large timber industry in Scandinavia and the Alps, for match-making in Sweden, for furniture in Austria, for wood-carving in the Alpine villages, and for the keeping of herds of swine in the forests of Southern Europe, especially in the Balkan Peninsula.

Coniferous trees have needle-shaped leaves, and shed cones every year. Usually they are very upright, and their trunks make good masts for ships. The chief of these trees found in Europe are pine, fir, and larch. In Southern Europe the trees are not so tall and much bushier.

Deciduous trees are those which shed their leaves each year. The oak, elm, ash, and beech are plentiful in Central Europe, while the chestnut grows on the Mediterranean slopes.

Evergreen trees, including the cork and other evergreen oaks and the olive, are found in the Mediterranean.

Along the shores of the Mediterranean and on the Alps trees have been ruthlessly cut down.

Cereals.

The chief cereals grown in Europe are *wheat*, *maize*, *oats*, *rye*, and *barley*.

Southern Russia, *Hungary*, the *Plain of Lombardy*, *South Italy*, and *France* are the chief wheat-growing regions. *Maize* requires a warm, damp climate, and is grown largely in *Rumania*, the *Valley of the Save*, and the *Plain of Lombardy*. *Oats* and *rye* will grow in poorer soils with a damper climate. The former are grown everywhere in *North Europe*, and the latter is plentiful on the poorer soils of *Eastern Germany* and *Russia*. *Barley* depends less on climate, and thrives best on a mixed soil of clay and chalk. It is grown over all *Central* and *Southern Europe*.

Southern Russia and the Plain of Hungary were once poor grass lands or steppes, suffering from extreme climates with little rainfall. They now produce large quantities of wheat, most of which is exported. Along the shores of the Caspian the soil is too poor to be utilised for wheat lands, and wandering shepherds still pasture their flocks and herds on these grass lands.

In Southern Italy the hard wheat of Apulia is made into *macaroni* and exported from Naples.

The basin of the Seine produces most of the French wheat, but the French consume large quantities of wheaten bread, and cannot grow sufficient for their own requirements.

Germany grows wheat, especially in the Middle Rhine Plain. Spain grows it on the plateau, and Bulgaria produces large quantities on its northern slope to the Danube.

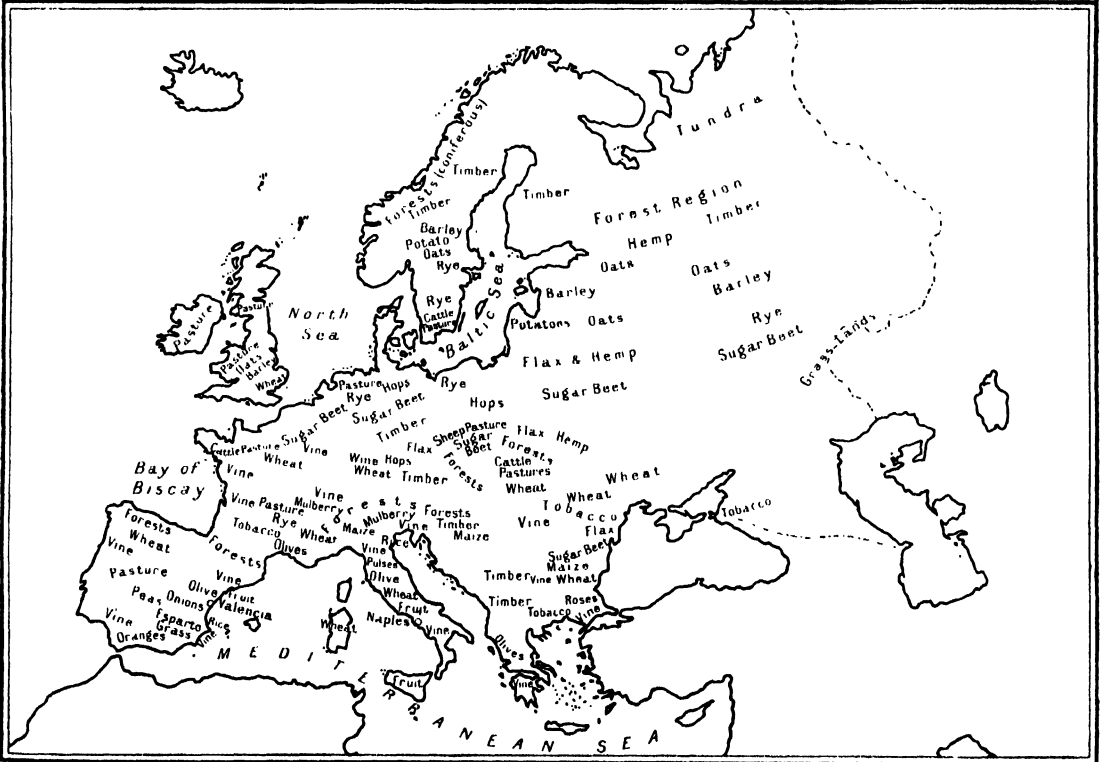
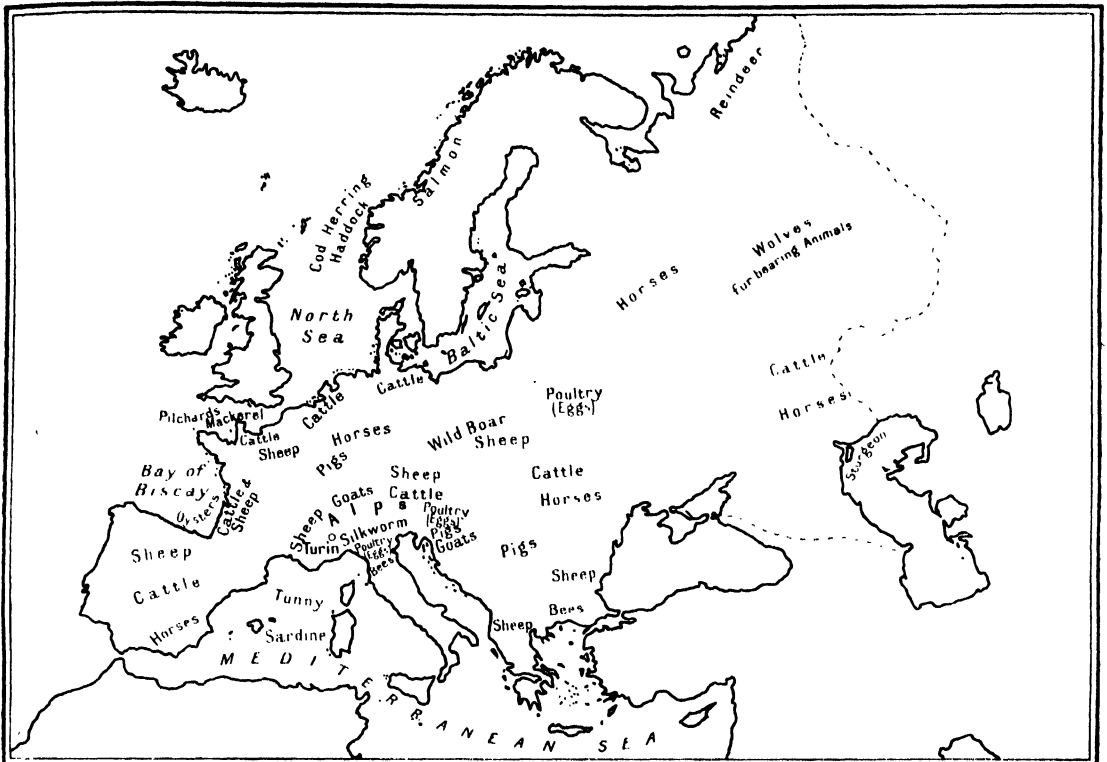
Maize is grown on the low left bank of the Danube which overflows and gives sufficient moisture. In Italy the Po provides enough water to allow of its growth, and this, together with the dry climate of the Plain of Lombardy, has caused the rearing of *poultry* and a large export of eggs.

Rye, grown in the countries bordering on the Baltic, is used in making rye bread, the chief food of the poorer peoples.

Root and other Crops.

The chief root crops of Europe are the *sugar beet* and *potato*. Both are grown largely throughout the Plain of Europe, but chiefly in *France* and *Germany*. The beet is used in the manufacture of beet sugar, while from the potato, starch and spirits are obtained.

Maps 31 and 32.



VEGETATION OF EUROPE.

Pulses.

Peas and beans are grown along the *shores of the Mediterranean*. In Spain and Italy they form an important article of food among the poorer classes.

Flax and Hemp.

These are grown chiefly for the fibre obtained from the stalk, and are cultivated in the *lands around the Baltic*, in *Russia*, *Austria*, and in the *Netherlands*.

Fruit.

The hot, dry summer of the Mediterranean region causes it to grow large quantities of fruit, chief among which are the *vine, orange, lemon, fig, date, mulberry, and peach*. The vine is also cultivated in *France* and *Germany*. *Apples, pears, plums, and cherries* grow all over Europe, though plums are most plentiful in the *northern valleys of the Balkans*, where they are dried. The various berries, including currants, are grown in the more northern regions.

The *vine* grows on the sunny, south slopes of hills. In *France champagne* is made from the juice of the grapes grown in the *Marne Valley* of the *Seine*. The vine of the *Garonne Basin* yields *claret*, while that of the *Saône* produces *Burgundy*. In Spain the *basin of the Douro* is famous for its *port*, and the *Guadalquivir Valley* for *sherry*. Along the Mediterranean shore *Valencia* dries its grapes for *raisins*.

Italy makes wine, and also dries grapes. *Greece* grows the small grape from which we obtain *currants*. *Turkey* produces *Tent*, and *Hungary* makes *Tokay* wine.

The *mulberry*, which is grown chiefly in *Italy* and the *Saône-Rhone Basin*, has caused the rearing of quantities of *silk-worms*, and a consequent important silk manufacture.

Tobacco.

Tobacco is grown in the *Garonne Basin* in *France*, and in the *Balkan Peninsula*. It requires a climate free from frost, especially when the plants are young.

Honey.

The growth of flowers in the Mediterranean region has attracted large numbers of bees, from which honey is obtained, especially in *Italy* and *Turkey*.

Pasture Areas.

The hill systems of *Central Europe* support large numbers of *sheep*, while *cattle, sheep, and goats* are fed on the summer pastures of the *Alps*, being driven into the valleys in winter. The lowlands of *Russia, Denmark* and *Holland* rear large quantities of *cattle*, making the countries famous for their dairy produce. *Brittany* and *Normandy*, in North-West France, are also noted for their *cheese* and *butter*.

The chief *wool* producing areas of Europe are the *Spanish Plateau, Saxony, and Silesia* in South Germany, the *Ardennes* in Belgium, and the hills of *Northern France*. The sheep in the *Balkan Peninsula* supply wool for *Turkish shawls* and *carpets*.

The cattle of the *Alps* account for the export of *condensed milk*, and also of *cheese* from *Switzerland* and the Italian slopes of those mountains. The sheep give rise to a *woollen industry* on the *Swiss Plateau*, and at *Turin*, in the Plain of Lombardy, while the *goats* supply material for *glove* making.

Fisheries.

The countries of *Western Europe* have a fishing industry similar to our own (*see Fisheries of British Isles*). The chief fishing peoples are the Norwegians. The Mediterranean possesses few fish, the *tunny* and *sardine* being the most important. *Oysters* are found on the low muddy shores of *Holland* and the *Bay of Biscay*. *Salmon* are caught in the rivers of Northern Europe, especially in *Norway*, and *sturgeon* in the rivers of the south-east, chiefly the *Volga*.

Owing to the scarcity of fish in the Mediterranean there is a large import from Western Europe into the countries of Spain, Italy, and Austria. The sturgeon found in the Volga yields *isinglass* and *caviare*, the latter delicacy made from its roe.

EXERCISES.

1. Name the chief forest areas of Europe. With what surface features do they coincide, and why? What products are obtained from them?
2. Draw a map showing the chief maize, wheat, rye, and oat producing areas of Europe. State in each case what climatic conditions determine their growth.

3. Draw a map showing the chief regions producing sheep, cattle, and pigs. With what surface features do most of the sheep pastures coincide?
4. On a blank map of Europe fill in the chief vine-producing areas. In each case state to what use the vine is put.
5. Name the parts of Europe where sugar beet and potatoes are grown largely. What manufactured products are obtained from these?
6. Name the chief fishing regions of the coast of Europe. Why is there a large import of fish into the countries bordering the Mediterranean from the North Sea fisheries?

Minerals.

Coal and *iron*, the most useful minerals, are abundant, and found close together. The richest coal and iron producing country is Germany, which, for that reason, carries on most manufactures; but rich coalfields are also found in Russia, Belgium, France, and Austria. Deposits of iron are abundant in Sweden, along the north coast of Spain, and in Finland (North Russia). *Copper* is found in Central Europe, Sweden, the Urals, and the south of Spain. *Mercury* and *lead* also exist in Spain. *Petroleum* is obtained from the northern slopes of the Carpathians and Caucasus. *Gold* is found in small quantities in the Urals and Carpathians, and *silver*, together with *lead*, in the Central Highlands. *Salt* is mined on the north slopes of the Carpathians, and *sulphur* is obtained from the volcanic regions of the Mediterranean.

Look carefully at the mineral map and find the following coalfields:—

Russia:—

- (1) In the Urals, here used for smelting the precious metals. *Perm* is the chief centre.
- (2) In the centre, south of Moscow; *Tula* the chief town.
- (3) In the south in the basin of the Don. *Kharkov* is the chief centre.
- (4) In the west in the basin of the Vistula; *Lodz* the chief centre.

Germany:—

- (1) The *Silesian Coalfield*, in the Upper Oder, bordering the Central Highlands; *Breslau* its chief centre.

- (2) *Saxony Coalfield*, to the west of the Upper Elbe, bordering the Central Highlands. *Chemnitz* is the most important town.
- (3) *Rhine Coalfield* in the lower Rhine plain. *Cologne* is the centre.

In addition to these coalfields there is a belt of brown lignite coal stretching through Central Germany and used in the manufacture of beet sugar. Brown lignite is half formed coal, being in a more advanced state than peat.

France and Belgium:—

- (1) *Nord Coalfield*, in north of France and southern half of Belgium. *Liege* is one of the most important towns.
- (2) *St. Etienne Coalfield*, bordering the western side of the Rhone rift, near Lyons.

Austria:—

- (1) *Bohemian Coalfield*, along the southern slope of the Ore and Giant Mountains. This coalfield is continued along the north foreland of the Carpathians, and causes Bohemia, Moravia, and Galicia to be busy manufacturing regions.
- (2) Rich iron deposits, with some coal, are found in Styria in the valleys of the Mur and the Drave. Rich iron deposits are found at *Dannemora* and *Gellivara* in Sweden, and along the *Northern shores of Spain*, where are situated *Bilbao*, *Santander* and *Gijon*.

Spain produces supplies of *copper* in the south, near the estuary of the Guadiana, which she exports from *Huelva*. *Lead* and *quick-silver* are found in the south-west. *Building stones* and *clay* are widely distributed. *Marble* is obtained, especially from *Italy* and *Greece*.

Manufactures.

The chief manufacturing areas are in Germany, Belgium, France, and Austria, and these are dependent on the supplies of coal

and iron found in those countries. The south of Europe having little mineral wealth is deficient in manufactures, and the few carried on depend on water-power supplied by mountain streams.

Iron and Steel Goods.

The great coal and iron fields of Europe form the chief regions for the manufacture of iron and steel goods. Germany, France, and Belgium are three of the most important countries so engaged, but of recent years the rich iron deposits of Russia have caused a great increase in that country's output. Sweden smelts her huge supplies of iron-ore with charcoal obtained from the forests. Austria possesses iron in the valleys of the Mur and Drave, but can only smelt it by means of imported coal or forest wood.

In Germany *Essen* on the Rhine coalfield manufactures guns. *Mannheim* manufactures goods from iron obtained from the Franco-German border.

Chemnitz is the centre of the Saxon hardware industry, and *Breslau* of that of Silesia. Both towns are noted for their machinery. *Berlin* and *Cologne* have great railway works.

Belgium manufactures chiefly railway plant and rolling stock. The chief town is *Liege*, but *Mons*, *Charleroi*, *Namur*, and *Brussels* are also busily engaged in making railway plant, tools, and machinery.

France makes railway plant, textile machinery, and guns on both her coalfields. *Lille* is the chief centre of the Nord and *St. Etienne* on the Rhone coalfield. *Nancy*, on the Franco-German border has important iron industries.

Russia is rapidly developing her rich mineral resources, especially in the Don Basin, where iron and steel works are increasing. On the Central coalfield *Tula* manufactures cutlery, small arms, and railway plant, while *Lodz* makes textile machinery. In Finland there are rich supplies of iron-ore, which is smelted for manufacture by means of charcoal at *Helsingfors*.

Textiles.

Woollen Goods are made chiefly on the Saxon and Silesian coalfields of Germany, the Belgian and north of France coalfield, the Bohemian coalfield, and the Lodz coalfield of Russia.

The sheep on the hills of Central Europe provide a part of the raw material required, but much is now imported from Australia and South America, and carried up the long, navigable rivers to the coalfields.

In the Belgian coalfield *Verviers* and *Brussels* are the chief manufacturing centres.

In Germany *Aix-la-Chapelle* obtains its wool from the Ardennes.

Chemnitz is the chief centre on the Saxon coalfield, and *Breslau* on that of Silesia.

Austria has woollen manufactures in *Bohemia*, the chief centre being *Reichenberg*.

The *Tula* coalfield in Central Russia also manufactures wool.

Roubaix and *Elbauf* with other towns in the north of France have woollen industries dependent on the sheep of the limestone and chalk escarpments. *Beziers*, to the west of the Rhone rift, has a similar industry due to the sheep reared on the limestone edge of the Central Plateau of France.

Barcelona, in Spain, has woollen manufactures.

Turin, having water-power, manufactures the wool of the Alpine sheep, and a similar industry is found on the *Swiss Plateau*, dependent on the water-power from the northward drainage of the Alps.

Cotton Goods.

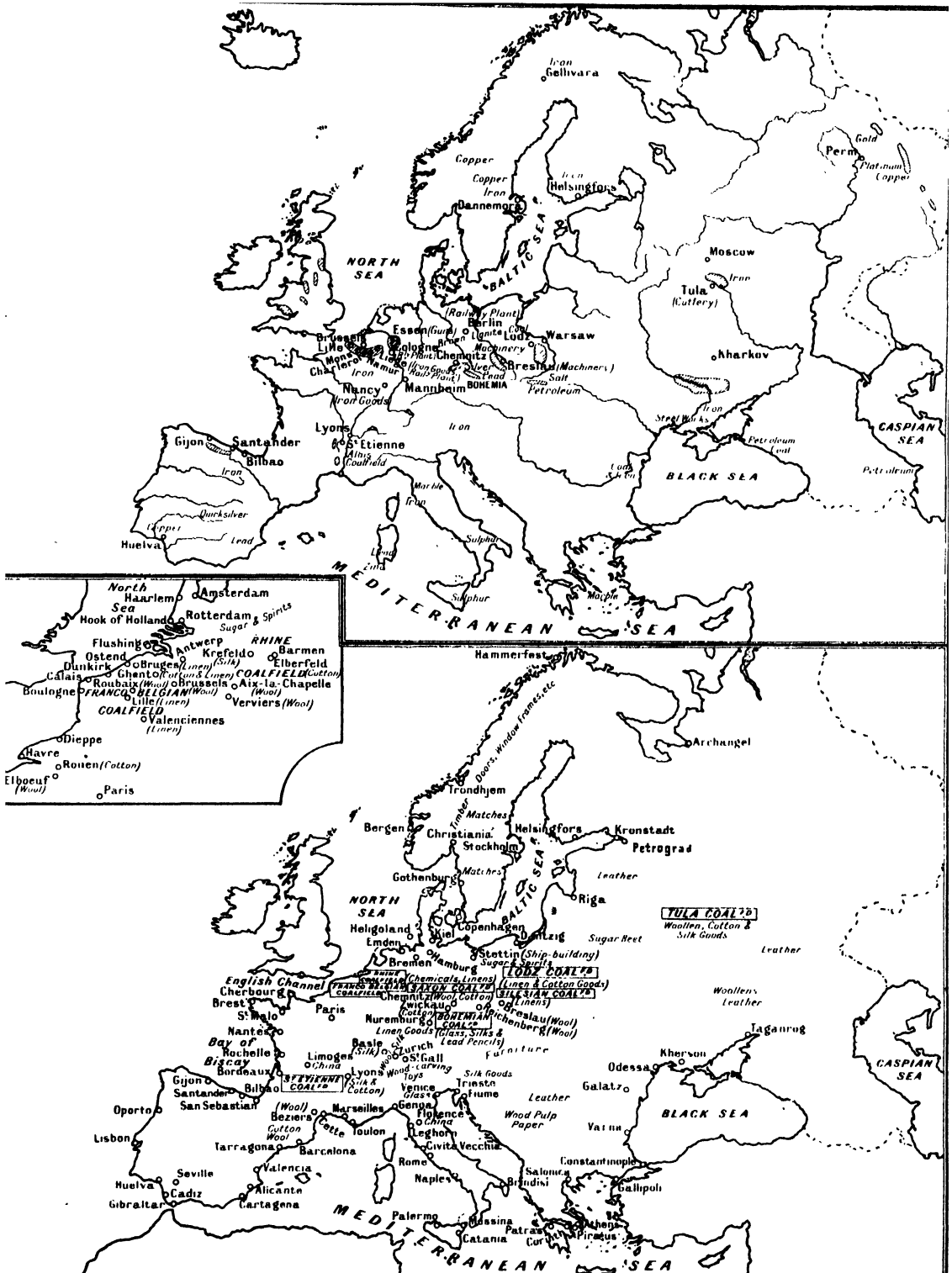
The easy import of raw material causes important cotton manufactures in the Belgian, Rhine, and Saxon coalfields. Cotton goods are also made in the Seine Basin at *Rouen*, and in the Lodz and Tula coalfields of Russia.

Ghent is the chief Belgian cotton town, and *Barmen-Elberfeld* in the Rhine coalfield, *Chemnitz* and *Zwickau* on the Saxon coalfield, make cotton, hosiery, and lace. The *Tula* coalfield of Central Russia depends upon the import of cotton from Asia, while the Lodz coalfield receives her raw material up the Vistula. *Rouen* and *Havre*, in the Seine Basin, manufacture cotton, importing the raw material from America and the coal from England. *Lyons* makes goods from cotton obtained from Egypt and the Far East through the port of Marseilles, using coal from the *St. Etienne* coalfield.

Linen.

The chief centre of this industry is on the Belgian coalfield, which not only manufac-

EUROPE—MINERALS AND IRON MANUFACTURES.



EUROPE—MANUFACTURES AND SEAPORTS.

tures its own raw material but imports from Baltic Russia. The waters of the Scheldt are especially suitable for cleansing. This industry is continued across the border to North-East France. The flax grown along the Baltic is also manufactured in Germany, Russia, Austria, and Holland.

The chief centres in *Belgium* are *Ghent* and *Bruges*, and those in *North-East France* are *Lille* and *Valenciennes*.

Germany manufactures the Baltic flax and some raw material obtained from the upper basin of the Danube.

Austria manufactures linen on the Bohemian and other coalfields of the northern border.

Russia has linen industries on the Lodz coalfield and at *Petrograd*.

Holland grows quantities of flax, most of which is used in Belgium, but some is made into "Brown Holland" at *Haarlem*.

Silk.

The production of raw materials from silk-worms reared in the Mediterranean region is responsible for a manufacture of silk goods in Italy and the Saône-Rhone Basin in France. Large quantities of the raw silk are imported into Switzerland and Germany, causing important manufactures in those countries. Russia manufactures silk obtained from Asia.

Italy has the greatest raw silk production of any European country, but her silk manufactures are not so important as those of other countries. *Milan* is the chief centre and makes ribbons.

France has the most important silk industry, which is carried on on the St. Etienne coalfield, with *Lyons* as the centre. The raw material obtained in the district is used, and large quantities are imported from China and Japan, through the port of *Marseilles*.

Switzerland has increased her silk industry during recent years. The tunnelling of the Alps allows of easy import from Italy, and this, with the water-power from the streams and cheap labour, has enabled this country to compete with others. *Basle*, *Zurich*, and *St. Gall* are the chief centres.

Germany has a large silk industry, chiefly on the Lower Rhine coalfield, with *Krefeld* as its centre. Inferior silks and mixed cotton and silk fabrics having the appearance of silk are manufactured largely.

Russia manufactures large quantities on the Tula coalfield, the raw material being obtained from her Asiatic possessions.

Austria makes silk goods in the mountain valleys of the south west and on the Bohemian coalfield.

Timber Industries.

In dealing with the Vegetation of Europe forests were noticed in Scandinavia, the Alps, the Central Highlands of Germany, Austria, in Central Russia, and Southern Europe. Dependent on these forests are several industries.

Norway and *Sweden* export timber, and make doors and windows in addition to large quantities of matches.

The forests of *Germany* cause a large manufacture of toys, with *Nuremberg* as the chief town employed. The country is also noted for its wood-carving.

Austria floats much timber down the Danube for export, and has a rapidly increasing furniture manufacture.

The *Alpine Districts* are noted for wood-carving, wooden clocks, and toys.

The forests of *Russia* yield resin, tar, turpentine, and potash, while the bark of the birch trees used in tanning gives peculiar odour to Russia leather.

The forests of the *Balkan Peninsula* cause a leather industry, while in the north-west is a wood-pulp manufacture for paper-making.

Sugar and Spirits.

The Vegetation Map showed a large area of the Great Plain of Europe growing sugar beet and potatoes, and these crops give rise to large sugar and distilling industries in Germany, Holland, Belgium, France, Russia, and Austria-Hungary.

Brown lignite coal, which is found in the same area in Germany, provides the necessary fuel.

Chemical Industries.

Germany is far in advance of any other country in chemical works. The rich deposits of potash and other salts found in Saxony have formed the basis of a large chemical manufacture. The chemicals have fostered the growth of minor industries, such as the making of gunpowder, glass, and soap, together with calico printing, dyeing, bleaching, and the preparation of photographic materials.

The silver silica and potash found in Bohemia cause it to have an *ornamental glass* industry, and the kaolin, graphite, copper, and cobalt are responsible for *porcelain* manufacture. The graphite gives rise to a *lead pencil* industry. Local deposits of porcelain earths support *china* works in Italy at *Florence*, *Venice*, and *Naples*. China is also made at *Sevres* (near Paris) and at *Limoges*, in France.

EXERCISES.

1. Draw a map showing the chief coalfields of Europe, and in each case insert the manufactures carried on in the district.
2. What special advantages have caused Germany to become one of the chief manufacturing countries of the world?
3. Why are the countries of the Mediterranean region not important as regards manufactures? Name the chief minerals produced in this region and the localities in which they are found.
4. Why does Belgium manufacture large quantities of railway plant?
5. Name the chief woollen and linen manufacturing areas of Europe. What special advantage has each of these areas for its particular industry?
6. Where is silk manufactured in Europe? Why has Switzerland been able to improve its silk manufacture during recent years?

Routes

The Surface Map shows that the gradual slope of Europe is towards the narrow parts of the North Sea and English Channel, and this direction of surface features has caused the routes of Europe to converge to these shores, making them the trade centre of the world. From the coasts opposite our own islands routes radiate in many directions, but these are largely determined by physical features, especially where mountains form barriers. Similarly the arrangement of physical features has caused several routes to converge at one place, and hence such towns as *Paris*, *Marseilles*, *Hamburg*, *Vienna*, and *Constantinople* became important. Most of the routes from the Atlantic shores of Europe to the Mediterranean have to cross the mountain axis, and in doing so use transverse river valleys, which are often connected to each other by a low col or pass.

Routes to the Mediterranean from the North Sea and Atlantic.

1. To Spanish Peninsula.

- (a) From *Paris* through the Gate of Poitiers to *Bayonne* in South-East France, through a low pass at the western end of the Pyrenees, across the Spanish Peninsula to *Madrid*, and following the basin of the Tagus to *Lisbon*.
- (b) Another branch of this route leads from the Rhone Basin round the eastern end of the Pyrenees, into the Ebro Valley, and thence to Madrid.
- (c) Other routes lead from Madrid to towns on the north coast, the west coast, and Mediterranean shores.

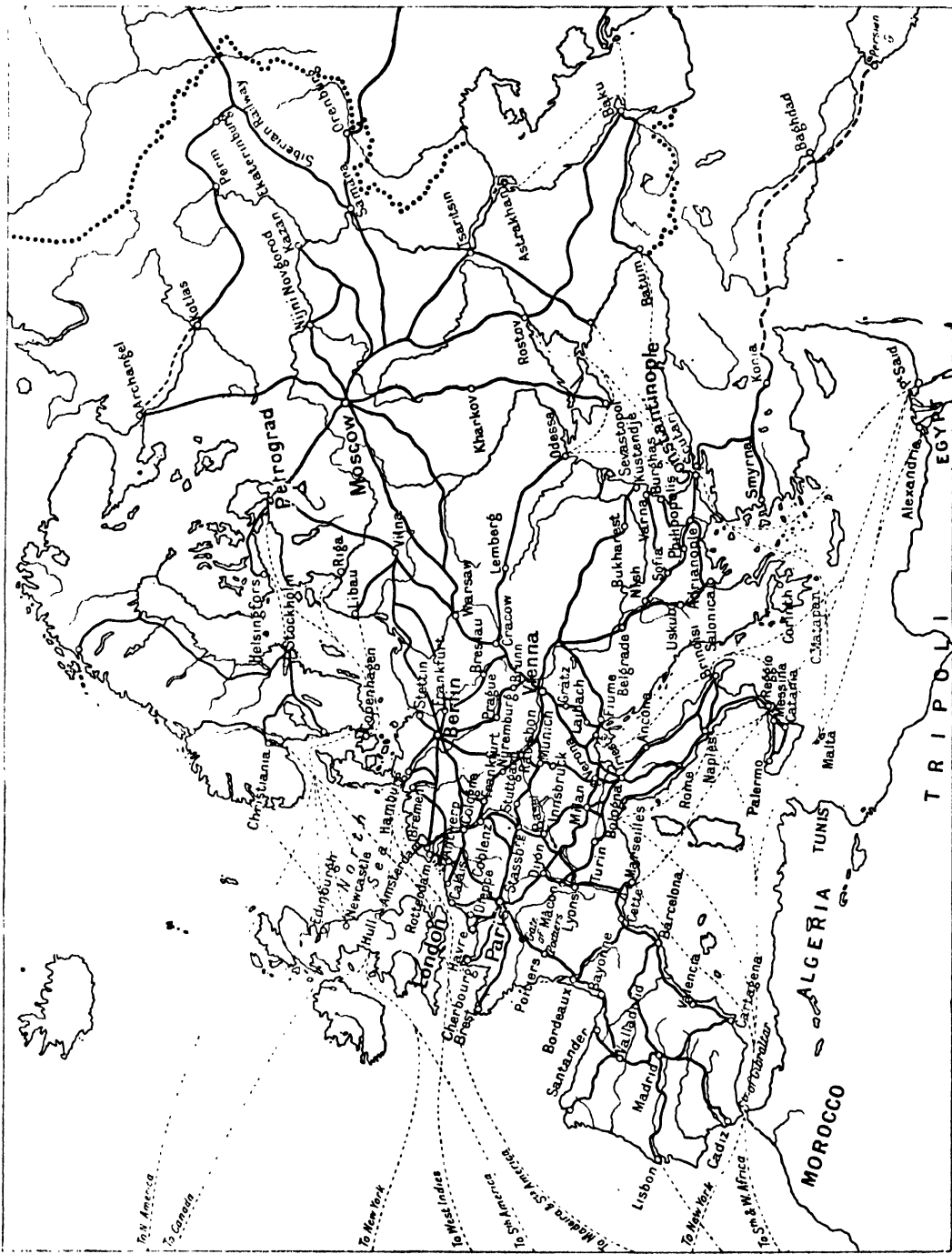
2. To Marseilles and Southern France.

- (a) *Paris* along the Seine Valley, over the low Plateau of Langres into the Saône Basin *via Dijon* to *Lyons* and *Marseilles*.
- (b) *Rotterdam* along the Rhine Valley to *Basle*, then through the Burgundian Gate into the Doubs Valley. From thence into the Saône-Rhone Valley to *Lyons* and *Marseilles*.
- (c) Western France, *Bordeaux* through the Carcassonne Gap to *Marseilles*.

3. To Italy.

- (a) *Paris* along the valley of the Seine, across the Plateau of Langres into the Saône-Rhone Basin *via Lyons*, from thence following the Upper Rhone Valley to the *Simplon Tunnel*, which makes communication with the basin of the Ticino, to *Milan*.
- (b) From *Lyons* crossing to the *Isère Valley*, following the upper course of the river, which is connected to the Po Basin by means of *Mt. Cenis Pass*.
- (c) From Germany and the Rhine to *Basle*, then following the transverse valley of the Reuss to the *St. Gotthard Tunnel*, which gives access to the transverse valley of the Ticino, to *Milan*.
- (d) From Germany and Austria following the valley of the Inn, crossing the low *Brenner Pass* to the transverse valley of the river Adige to *Verona*.
- (e) *Milan*, *Turin*, and *Verona* are connected by rail through the Plain of Lombardy. Two main routes run down peninsula Italy, one on the west side *via Genoa*, *Rome*, and *Naples*, terminating at *Reggio*; the other following the east coast *via Bologna* and *Ancona* to *Brindisi*.

Map 35.



ROUTE MAP OF EUROPE.

Scale 488 miles to the inch.

Fig. 16 shows the routes across the Alps. Carefully trace where these routes use natural features.

4. To Austria and the Balkan Peninsula.

- (a) *Vienna* through the *Semmering Pass*, crossing into the valleys of the *Mur*, *Drave*, and *Save* to *Trieste*, the Adriatic port of Austria (see fig. 16).
- (b) Routes from Western Europe converge on *Vienna*, and then follow the valley of the *Danube* to *Belgrade*. From thence they follow the valley of the *Morava* to *Sofia* into the Plain of East Rumelia, and the upper course of the *Maritza* to *Constantinople* on the Plain of Thrace.
- (c) A branch of the above crosses from the *Morava Valley* into the valley of the *Vardar* to *Salonica*.

Fig. 17 shows the natural features of the Balkan Peninsula and the routes utilising them.

5. To Vienna and Central and Southern Europe.

- (a) *Paris* to *Vienna* following the *Seine Valley*, crossing the *Vosges* to *Strassburg* in the *Rhine Valley*, and so to *Stuttgart* in the *Neckar Valley*. From thence, crossing the Alpine tributaries of the *Danube*, *via Ulm* and *Munich* to *Vienna*.
- (b) *Rhine Ports* and *Belgium* to *Vienna*, using the valley of the river to *Mainz*, thence following the *Main* to *Nuremberg* and joining the *Danube* at *Ratisbon*, and following that river to *Vienna*.
- (c) *Hamburg* to *Vienna via Berlin* to *Frankfort*, and then following the *Oder Valley* to the *Moravian Gate* and the valley of the *March* to *Vienna*.
- (d) *Petrograd* and the Russian Baltic shores *via Warsaw* to *Cracow*, and the *Moravian Gate* to *Vienna*.

East and West Routes across Europe.

Paris, *Rotterdam*, etc., to *Berlin*, then following the lower ground between the *Baltic Heights* and the *Central Highlands*, through—

- (a) *Posen* to *Petrograd*; or through—
- (b) *Warsaw*, with branches to *Moscow* and *Petrograd*.

Russian Railways.

As Russia is very flat, railways are easily constructed, and have developed rapidly

within the last few years. *Moscow* is the great centre, and from it lines radiate to *Petrograd*, *Warsaw*, *Odessa*, *The Crimea* and *Sevastopol*, *Archangel*, *The Caucasus* and *Transcaucasia*, *Orenburg* and *Russian Asiatic Turkestan*, and to *Samara*, and continued through Asia to the Pacific coast (see Asia).

Canals.

The Great Plain of Europe is crossed by long, navigable rivers, and these, especially in Germany, Holland, and Belgium, are connected by a network of canals. Elsewhere the natural gateways between the higher lands allow of the great river-systems being connected. The *Kiel Canal*, cut across the southern end of the peninsula of Jutland to connect the North Sea and the Baltic, is the most important ship canal.

In *France* canals connect the *Seine* with—

- (1) The *Meuse*, which flows through Belgium.
- (2) The *Rhine* and the *Moselle*, for German trade.
- (3) The *Saône-Rhone*.
- (4) The *Loire*.

In the south the *Garonne* is connected with the *Mediterranean* by the *Canal du Midi* through the *Carcassone Gap*.

In *Germany* the *Rhine* is connected with the *Rhone* through the *Burgundian Gate*, and to the *Danube via* its tributary the *Main*. The *Dortmund-Ems Canal* connects the *Rhine* to the *Ems*, so that the German *Rhine* has an outlet to the North Sea without passing through Holland. The *Elbe* and *Oder* are connected by a canal which passes through *Berlin*, and the latter river is connected through the *Moravian Gate* with the *March*, and so to the *Danube*.

In *Holland*, *Amsterdam*, on the *Zuyder Zee*, is connected with the *North Sea* by canal. This permits large boats to reach *Amsterdam*, a feat formerly impossible owing to the shallow water of the *Zuyder Zee*.

In *Belgium*, *Antwerp* is joined to *Liege* by canal.

In *Sweden* the *Gota Canal* connects *Lakes Wener* and *Wetter*, and thus to the sea via the *Gota River*.

In *Russia* canals are easy of construction. The *Don* and *Volga* are joined, as are most of the chief rivers.

The *Isthmus of Corinth*, which connects the peninsula half of Greece with the mainland, is cut through by the *Corinth*

Canal, and small ships can pass through, thus saving the journey round Cape Matapan.

Route Towns.

These are important, because natural features have caused the convergence of routes. The chief route centres of Europe are

east converge on it after passing through the Moravian Gate, and routes from the Alps also cross to Vienna.

Paris is the bridge port of the Seine, and the confluence of the tributaries of that river, all within the district of Paris, has caused it to become a centre of routes. The routes from the Channel ports, those from South-West France through the



Fig. 7. River System and Routes of the Balkan Peninsula.

Vienna, Paris, Moscow, Berlin, and Constantinople, as well as the seaports of *Hamburg and Marseilles*.

Vienna stands in the middle of the Austrian Plain behind the Carpathian Gate. The routes from the south-east converge on it to pass through the Carpathian Gate, those from the west to pass through the Austrian Gate, those from the north and

Gate of Poitiers, and those from the Saône Rhone Basin over the Plateau of Langres, all converge on Paris, in addition to those which, using the tributaries of the Seine, cross into Belgium and Germany.

Moscow.—As the rivers radiate from the Valdai Hills, so the routes radiate from Moscow, the central point of the Eastern Plain. This city was once the capital

of Russia, and the removal of the seat of government to Petrograd has not taken away its importance.

Berlin, on the Spree, a small tributary of the Elbe, lies on low ground within easy access of the North and Baltic Seas. Routes also converge on Berlin from the south, following the upper courses of the Elbe and Oder, and meet the east and west route which crosses the plain from France to Russia. This centralisation of routes causes Berlin to be a suitable capital for the German Empire.

Constantinople, the capital of the Turkish Empire, is situated on the Golden Horn, an arm of the Bosphorus, and therefore controls all the trade between the Black and Mediterranean Seas. Fig. 17 shows how the railway crosses the Balkan Peninsula to Constantinople. On the other side of the narrow Bosphorus strait is the Asiatic suburb of *Scutari*, from which a railway crosses Asia Minor and is being continued to the Persian Gulf (see Routes of Asia). In past history many of the invading tribes from Asia crossed this strait into Europe. Constantinople is therefore situated where the great land route from Europe to Asia crosses the sea route between the Black and Mediterranean Seas.

Warsaw, the capital of Russian Poland, situated on the Vistula, is the point to which routes from Russia converge to reach Western Europe. The town has railway communication with the Atlantic Plain through Berlin, and with Austria and Vienna through Cracow and the Moravian Gate.

Cracow and *Lemberg*, on the northern slope of the Carpathians, are route towns of lesser importance. Here the railways from South-East, East, and North-East Europe converge to pass through the Moravian Gate.

Dijon, in the Saône-Rhone Basin, is the converging point of the routes from the Seine and Rhine Valleys.

Lyons, also on the Saône-Rhone Basin, is the meeting-place of routes from Dijon to Milan, Turin, and Marseilles.

Turin, *Milan*, and *Verona* are situated at the southern end of routes which have crossed the Alps. All three towns are connected with both the east and west routes which run to the foot of the Italian Peninsula.

Strassburg is a fortress guarding the route which cuts through the Vosges Mountains from France.

Coblentz, at the confluence of the Moselle, and *Cologne*, on the Lower Rhine Valley, where routes from Belgium cross the river, are important route towns in the Rhine Basin.

EXERCISES.

1. What would be the advantages and disadvantages to Britain if France cut a deep ship canal from Bordeaux through the Carcassone Gap to the Mediterranean?
2. Describe the route from Vienna to Constantinople, showing how it takes advantage of natural features.
3. Show how the cutting of the Kiel Canal has proved advantageous to Germany.
4. From the Route Map of Europe name all the land and sea routes converging on Marseilles.
5. Describe the chief routes radiating from Paris.
6. Show that Moscow is still the railway centre of Russia, and name the routes radiating from it.
7. Name those parts of Europe which allow of easy railway and canal communication. State some of the most important railways and canals in each part you mention.
8. Describe the position of Constantinople, and show what routes pass through it.
9. State the chief routes which converge on Vienna, and show how they use natural features.
10. Name the chief routes from North to South Europe. Point out in each case how they cross the mountain axis.

Commerce and Seaports.

Situated on the north-west coasts of Europe, on the estuaries of long, navigable rivers which drain the Great Plain, are important seaports which export the produce of a rich interior and trade largely with the British Isles and the New World. The chief of these ports are *Hamburg*, at the mouth of the Elbe; *Rotterdam*, at the mouth of the Rhine; *Antwerp* at the mouth of the Scheldt; and *Havre*, at the mouth of the Seine.

The countries bordering the North Sea and the Atlantic have the best situation for trade for the following reasons:

- (1) They are in the centre of the land hemisphere.
- (2) The Plain of Europe allows a network of railways for the carriage of goods.

- (3) Long, navigable rivers linked by canals make easy water-carriage.
- (4) The mild climate, the rich soil, and the mineral deposits (especially those of coal and iron) support a dense population of highly civilised peoples.
- (5) These people draw the requirements of life from all parts of the world, exchanging for them the results of their labours in the shape of manufactured and other goods.

In early days, before America was discovered, the Mediterranean was the trade centre of the world. The discovery of the New World transferred this trade centre to the Atlantic shores of Europe. At the same time the growth of steam power caused the countries of Western Europe to develop manufactures and to support dense populations. Against this the Mediterranean countries, being deficient in coal and iron, could not compete, and their ports rapidly decreased in importance. Since the opening of the Suez Canal the Mediterranean has become the great passage-way to India and the Far East, and this has caused a revival in the trade of its ports. The chief seaports of the Mediterranean are *Marseilles*, *Genoa*, *Naples*, and *Trieste*.

The Baltic and the Black Seas are almost land-locked, and therefore have not such important ports, although *Constantinople*, guarding the outlet of the Black Sea, and *Copenhagen*, guarding the outlet of the Baltic, occupy very important positions.

Russia.

Russia, having no open sea except in the frozen north, is badly situated for European trade. The Baltic is closed by Denmark, the Black Sea by Turkey. Large quantities of raw material are therefore imported from Russia's Asiatic possessions. The chief ports are *Petrograd*, *Riga*, and *Helsingfors*, on the Baltic; *Archangel*, on the White Sea; *Odessa*, *Batum*, and *Kherson*, on the Black Sea; and *Taganrog*, on the small Sea of Azov. The chief ports on the Caspian Sea are *Astrakhan* and *Baku*.

Petrograd, on the Neva estuary into the Gulf of Finland, is the capital of Russia. *Kronstadt* is an important naval station

guarding it. *Helsingfors* is the port of Finland. *Riga* is on the estuary of the West Dwina or Duna, and has a large export trade in grain and forest produce.

Archangel is the only important port of Northern Russia. It exports timber, tar, resin, and furs from the forest regions, and train oil from the Arctic fisheries. It is ice-bound for a great part of the year.

Odessa, near the mouths of the Dneister, Bug, and Dneiper, is the chief outlet of the Russian wheat lands and steppes, and is the most important port of Southern Russia.

Batum has a large trade in grain and petroleum.

Kherson is an important grain port.

Taganrog exports grain, but its importance is diminished by the shallowness of the Sea of Azov.

Astrakhan, being on an inland sea, has its trade almost restricted to the adjoining land of Asia.

Baku has a very important trade in petroleum. The oil is mainly sent to *Batum* for export.

<i>Chief Exports</i>		<i>Chief Imports</i>	
	£59,000,000	Machinery	£16,400,000
Timber	16,400,000	Raw cotton	10,000,000
Eggs	9,000,000	Coal	8,000,000
Tax	8,700,000	Raw wool	5,300,000
Dairy produce	7,200,000	Textile goods	5,000,000
Petroleum	5,000,000	Fish	3,500,000
Furs and leather	5,000,000	Chemicals	3,000,000
Platinum	2,000,000	Tea	3,000,000

The chief exports to the United Kingdom are wheat, timber, butter, egg, flax and sugar.

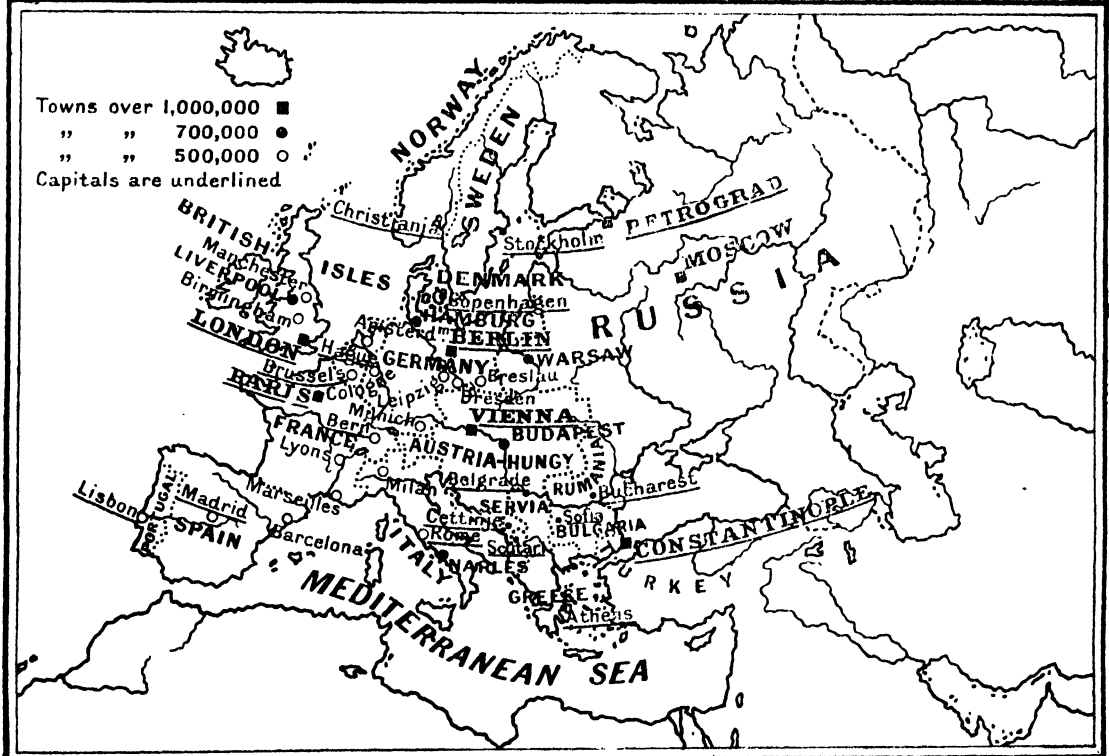
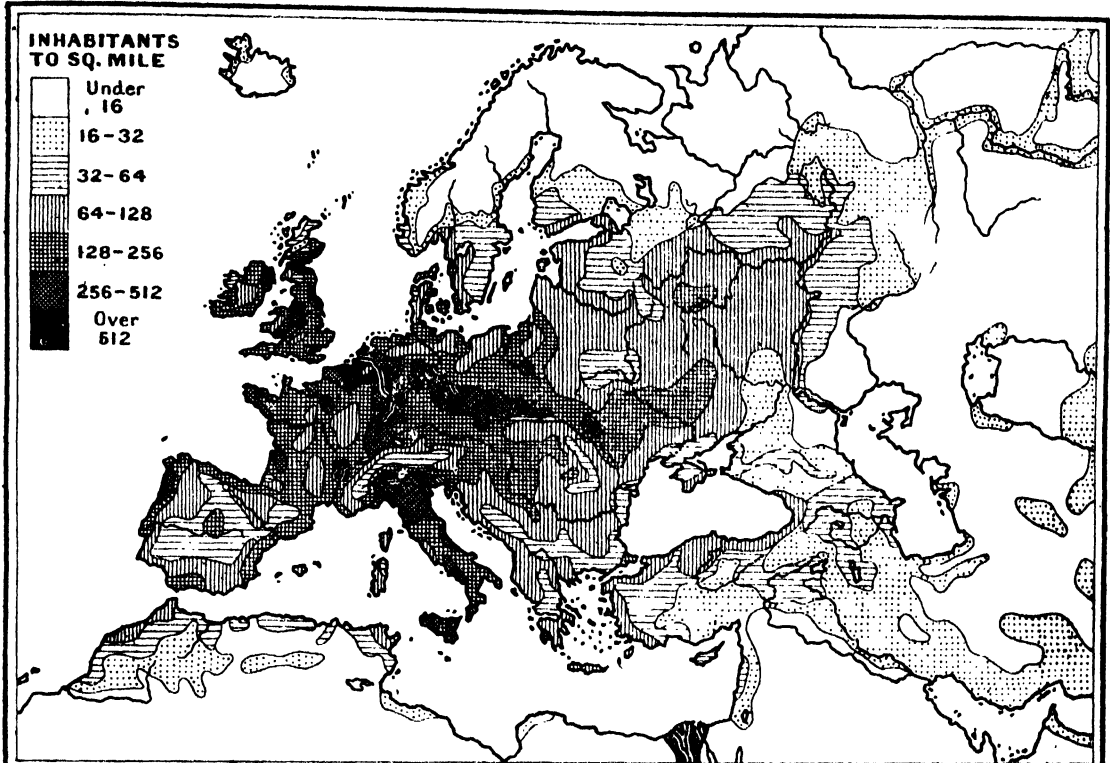
The export trade is mainly with *Germany*, the *United Kingdom*, the *Netherlands*, *France* and *Italy*.

The imports are principally obtained from *Germany*, the *United Kingdom*, the *United States*, *France*, and *Austria-Hungary*.

Denmark.

Denmark, possessing no mineral wealth, has to import textiles, iron goods, and coal. Her chief export is dairy produce. *Copenhagen* is the chief port, and is also the capital.

Copenhagen, situated on the east coast of the island of Zealand, guards the Sound, which is the gateway of the Baltic, and therefore holds an important position similar to that of Gibraltar and Constantinople.



Aarhuus on the *Great Belt*, has an important trade in grain and dairy produce.

Elsinore has a commanding position on the *Sound*.

Chief Exports.		Chief Imports.	
Dairy produce	£26,000,000	Cereals . .	£6,300,000
Animals . .	3,200,000	Metals . .	4,000,000
		Coal . . .	3,400,000
		Textiles . .	3,000,000

The chief exports to the United Kingdom are butter, bacon and eggs.

The commerce of the country is mainly with *Germany*, the *United Kingdom*, *Sweden*, the *United States* and *Russia*.

Scandinavian Peninsula.

The Scandinavian Peninsula, having few manufactures, imports textile and iron goods in addition to coal and grain. The chief exports are timber, matches, wood pulp (for paper), fish, and ice (from Norway), and iron ore, pig-iron, and copper (from Sweden). The chief ports are *Stockholm*, *Gothenburg*, *Christiania*, *Bergen*, *Trondhjem*, *Hammerfest*, *Malmo*, and *Carlskrona*.

Stockholm, the capital of Sweden, on the Baltic, is connected by rail with *Gothenburg* and *Christiania*, the capital of Norway. It is ice-bound for four months in the year.

Bergen, *Trondhjem*, and *Hammerfest* are chiefly engaged in the fishing industry. The chief fish dealt with are cod and herring.

Malmo is an important packet station, and *Carlskrona* is a naval station.

Norway.

Chief Exports.		Chief Imports.	
Fish & animal produce . .	£6,100,000	Machinery . .	£4,600,000
Timber . . .	4,500,000	Cereals . . .	3,500,000
Skins . . .	1,600,000	Minerals . .	3,300,000
Paper . . .	1,500,000	Textiles . . .	2,500,000

The trade of Norway is mainly with *Germany*, *Great Britain* and *Ireland*, *Sweden*, *America* and *Russia*.

Sweden.

Chief Exports.		Chief Imports.	
Timber . . .	£16,000,000	Coal . . .	£6,500,000
Animals and products . .	5,500,000	Textile materials . .	4,200,000
Minerals . .	4,500,000	Cereals . . .	3,600,000
Paper . . .	2,200,000	Textile goods . .	3,000,000

The chief exports to the United Kingdom are timber, butter, wood-pulp, and paper.

The trade of Sweden is mainly with *Great Britain* and *Ireland*, *Germany*, *Denmark*, *France* and *Norway*.

Germany.

Germany has to import grain and meat in addition to tropical produce to support her manufacturing populations. She also imports large quantities of raw material, timber, and Welsh coal for her manufactures. Textile and iron goods, chemicals, glass, and beet sugar are exported. Her chief ports are *Hamburg*, *Bremen* and *Emden*, on the North Sea; and *Stettin*, *Dantzig*, *Kiel*, and *Lubeck* on the Baltic.

Hamburg is the North Sea outlet of both the Elbe and Oder Basins, and the Kiel Canal brings much of the Baltic trade to this port. The river has been artificially deepened to enable large vessels to reach the town, and railways from all parts converge on it, thus increasing its trade. Its outport is Cuxhaven. *Heli-goland*, a small is-let, is the German naval station guarding the Elbe. The Elbe estuary is connected with the Baltic by a ship canal.

Bremen, with its outport of Bremerhaven, on the estuary of the Weser, and *Emden*, at the mouth of the Ems, are similar outlets of Western Germany, both having a large Atlantic passenger trade. Bremen is the headquarters of the North German Lloyd steamers.

Stettin, at the mouth of the Oder, is one of the largest shipbuilding towns of Germany. The Oder forms an excellent water route almost to the Austrian boundary.

Dantzig, at the estuary of the Vistula, exports much of the produce of Russian Poland, such as wheat, timber, flax and hemp.

Kiel is a rising port at the Baltic entrance of a ship canal across Jutland.

Lubeck was formerly of great importance and still holds an important position at the western end of the Baltic coast of Germany.

Chief Exports.		Chief Imports.	
Copper wire	£62,000,000	Cotton (raw)	£29,000,000
Machinery & iron goods	57,000,000	Wheat . .	21,000,000
Aniline dyes . .	34,000,000	Hides . . .	21,000,000
Coal . . .	26,000,000	Barley . .	20,000,000
Cotton goods . .	19,500,000	Copper . .	17,000,000
Woollen goods	14,500,000	Coffee . .	12,000,000
Sugar . . .	13,000,000	Iron ore . .	11,000,000
Coke . . .	6,000,000	Wool . . .	10,500,000
Glassware . . .	6,000,000	Eggs . . .	9,500,000
Rye . . .	6,000,000	Nitrates . .	8,500,000
Leather . . .	5,500,000	Silk (raw)	7,200,000
Silk goods . .	5,300,000		

The chief exports to the United Kingdom are sugar, glass, and manufactures of wood and iron.

German trade is mainly carried on with *Britain, Austria, the United States, Russia and France.*

Holland.

Holland has few manufactures of her own, but her position at the outlet of the Rhine and Meuse causes her to be a great trading nation. Ships of this country carry the products of the European Plain to all parts of the world, bringing back food-stuffs (especially tropical produce from the East and West Indies). *Rotterdam* is the chief port, but *Amsterdam* is an important port since the cutting of the North Sea Canal. The *Hook of Holland* and *Flushing* are packet stations.

Rotterdam, on the chief mouth of the Rhine delta, has a deep canal connection with the sea. It is the natural outlet for the products of the Rhine valley, but much of the Dutch and some of the Belgian pass through it, the latter coming *via* the Meuse Valley.

Amsterdam is at the mouth of the Amstel and has good routes into the interior. It is an important manufacturing centre and market town, as well as being one of the chief ports of Holland, owing to the construction of the North Sea Canal.

The *Hook of Holland* has passenger traffic with Harwich, and *Flushing* is similarly connected by mail route with Queenborough (see English Routes).

Chief Exports.

Paper . . .	£7,000,000
Sugar . . .	7,000,000
Margarine . . .	4,800,000
Butter . . .	3,300,000
Cheese . . .	1,700,000

Chief Imports.

Iron . . .	£20,000,000
Coal . . .	10,500,000
Cereals . . .	10,000,000
Textiles . . .	10,000,000
Timber . . .	8,000,000

Holland trades mainly with *Germany, Great Britain, Belgium, Russia, and the Dutch East Indies.*

Belgium.

Belgium is a small country with a dense population, and therefore requires a large import of food-stuffs. Raw material is also imported for manufacturing purposes, and goods made in the country and in South-West Germany are exported. *Antwerp* is the important port, while *Ostend* and *Bruges* are of much less importance. *Ghent* is a canal port.

Antwerp, on the tidal river Scheldt, is connected by a network of canals with the

Meuse, Seine, and Rhine, and thus is the outlet for a large hinterland, including Belgium, Northern France, and Germany.

Ostend is a packet station having a regular service with Dover.

Bruges is mainly noted for its manufacture of lace.

Ghent is noted for its important textile industries.

Chief Exports.

Iron & steel . . .	£10,000,000
Flax . . .	5,300,000
Cars (tram, etc.) . . .	3,800,000
Chemicals . . .	3,600,000
Zinc . . .	3,500,000
Cottons . . .	3,000,000

Chief

Wool . . .	£16,000,000
Wheat . . .	15,000,000
Cotton (raw) . . .	8,000,000
Hides . . .	7,500,000
Coal . . .	6,000,000
Rubber . . .	5,700,000

The chief exports to the United Kingdom are woollen yarn, cottons, flax, zinc, and linen.

Belgium trades mainly with *France, Great Britain, Germany, United States, and Holland.*

France.

When dealing with manufactures we found that this country imported large quantities of raw silk, raw cotton, and wool. Her dense population requires, in addition to tropical produce, imports of grain and meat. She exports woollen, silk, cotton, and leather goods, also wine, cheese, and butter. *Marseilles*, to the east of the Rhone delta, is her chief Mediterranean port. *Bordeaux*, at the Gironde mouth, is the outlet for the fertile plains of Aquitaine, and *Havre* is the most important port on the English Channel. *Nantes, St. Nazaire, Caen, Cette, St. Malo, Dunkirk*, and *Toulon* are also important ports. *Calais, Boulogne*, and *Dieppe* are cross-channel ports.

Marseilles is the outlet of the French trade with the Mediterranean and the Far East. It is the most important port on the whole Mediterranean coast, and is the chief French port. It has also an important manufacture of soap. *Toulon*, to the east of it, is the French naval station, and *Cette* is a wine port at the outlet of the Canal du Midi.

Bordeaux, with its outport *Paulliac*, exports the wine and tobacco grown in the interior. *Rochelle*, to the north of it, and *Nantes*, with its outport *St. Nazaire* at the Loire mouth, are important ports on the coast of the Bay of Biscay. *Brest* is an important naval station on the Brittany coast, and *St. Malo* exports

the early fruits and vegetables grown in that province.

Havre and *Rouen* are the outlets of the Seine Valley. *Dunkirk*, on the North Sea coast, is the chief port for the manufacturing areas in the North-East of France. *Cherbourg*, on the Cotentin Peninsula, is the naval station of the Channel. Find on the map *Calais*, *Boulogne*, and *Dieppe*. From them steamers cross the Channel to Dover, Folkestone, and Newhaven on the south coast of England.

Chief Exports.

Silk goods	£15,000,000
Cotton goods	14,500,000
Motor cars	8,000,000
Wine	8,000,000
Woollen goods	8,000,000
Paris goods	7,700,000
Raw silk	6,400,000
Iron goods	5,000,000

Chief Imports.

Wool	£27,500,000
Cereals	24,000,000
Coal	22,000,000
Cotton (raw)	21,000,000
Silk (raw)	12,000,000
Machinery	12,000,000
Coffee	9,000,000
Rubber	8,000,000

The chief exports to the United Kingdom are manufactures of silk, wool, and cotton; butter and apparel.

French trade is mainly carried on with *Great Britain*, *Belgium*, *Germany*, and the *United States*.

Mediterranean Countries.

The Mediterranean countries, having few manufactures, all import textiles, machinery, and coal, in addition to food-stuffs.

The lands bordering the Mediterranean Sea have always supplied good sailors and explorers, and in past ages took a very important place in the world's commerce. The Phœnicians, Carthaginians, Greeks, Romans, and Saracens lived near the Mediterranean shores, and were the great nations of antiquity. The Suez Canal has made the sea once more the great commercial highway to the East.

Gibraltar.

Gibraltar is a fortress on a barren rock guarding the narrow entrance to the Mediterranean about 10 miles wide. A large new dockyard and harbour have been constructed, making it an important coaling station and a naval base for the British Navy.

Spain and Portugal.

Spain and Portugal export quantities of wine, dried grapes, and subtropical fruits, and the former country exports mineral ores to Britain. The coast of the peninsula is not favourable to commerce owing to dangerous

currents, poor harbours, and defective inland communication. *Lisbon*, at the mouth of the Tagus, is an important port and coaling station. *Oporto*, at the mouth of the Douro, exports the wine of that basin. *Barcelona* is the chief Mediterranean port.

Lisbon possesses an excellent natural harbour and good inland communication. It has the additional advantage of facing the open Atlantic.

Barcelona is situated on a good harbour, but, like all the Mediterranean ports, it has the disadvantage of being situated on an inland sea.

Oporto owes its importance almost solely to its export of port wine. The Douro is only navigable for small vessels.

San Sebastian, *Santander*, *Bilbao*, and *Gijon* export the iron ores found on the north coast of Spain, and *Huelva* exports the copper found in the south-west.

Cadiz is an important naval station and port near the mouth of the Guadalquivir, and *Seville* is a river port on that river.

Valencia, *Malaga*, *Alicante*, *Cartagena*, and *Tarragona* are ports on the Mediterranean coast exporting chiefly the wines and fruit of the interior. *Cartagena* is also of importance as a naval station.

Spain.

Chief Exports.

Metals	£5,700,000
Wine	4,200,000
Oranges	3,500,000
Other fruits	3,000,000

Chief Imports.

Machinery	£6,000,000
Cotton goods	5,300,000
Animals and animal products	2,800,000

The chief exports to the United Kingdom are wine, iron, copper, quicksilver, oranges and raisins.

The trade of Spain is mainly with *Great Britain*, *France*, *Germany*, the *United States*, and the *Spanish Possessions*.

Portugal.

Chief Exports.

Wine	£2,700,000
Cork	1,000,000
Fish (preserved)	500,000

Chief Imports.

Cotton	£1,400,000
Coal	1,000,000
Wheat	1,000,000
Iron goods	1,000,000

The export to the United Kingdom is mainly wine.

The trade of Portugal is chiefly with her own colonies and *Great Britain*.

Italy.

Italy imports some raw materials for her manufactures, and exports both manufactured and raw silk, olive oil, sulphur, and eggs, in

addition to quantities of wine, dried grapes, and subtropical fruits. The situation in the Mediterranean, half way between Gibraltar and the Suez Canal, is a great commercial advantage. *Genoa*, in the north-west, *Naples*, in the south, *Venice*, at the head of the Adriatic, *Messina*, *Leghorn*, and *Palermo* are the chief ports.

Genoa, to the east of Marseilles, is the outlet of the Plain of Lombardy, being connected with it by a railway crossing the mountains. It possesses an excellent harbour.

Naples, in the south of Italy, has a deep and spacious harbour. In addition to its export and import trade it is the calling port for the Orient Steamship Overland Route.

Leghorn, the port of Florence, and *Civita Vecchia*, the port of Rome, are also on the west coast of Italy.

Venice, at the head of the Adriatic, is the outlet for the eastern part of the Plain of Lombardy. It is built on numerous islets in a shallow lagoon, the streets being replaced by canals. It is noted for its fine buildings, which include St. Mark's Cathedral, the Doge's Palace, and the Bridge of Sighs. It was of great commercial importance in the Middle Ages.

Brindisi, at the south-east end of the Italian Peninsula, is the calling port for the overland route of the Peninsular and Orient Steamship Company.

Palermo, *Messina*, *Catania* are ports of Sicily exporting the wines, fruits, and sulphur of that island.

Spezia is the chief Italian naval port. It is situated a little to the north of Leghorn.

Ancona is a valuable port on a good harbour on the Adriatic coast.

Chief Exports.

Silk (raw)	£13,700,000
Cotton goods	8,300,000
Dried fruits	5,000,000
Silk goods	4,300,000
Wines	4,000,000
Cheese	3,000,000
Hides	2,400,000
Hemp	2,200,000
Olive oil	2,000,000
Eggs	2,000,000

Chief Imports.

Wheat	£16,000,000
Coal	14,000,000
Cotton (raw)	12,000,000
Timber	5,000,000
Fish	2,000,000
Coffee	
Rubber	2,000,000
Machinery	2,000,000

The chief exports to the United Kingdom are olive oil, hides, eggs, silk goods, and cheese.

The trade of Italy is mainly with *France*, *Great Britain*, *Germany*, the *United States*, and *Austria Hungary*.

Malta.

This is an important British possession and naval station situated 60 miles to the south of Sicily. It guards the passage between the Eastern and Western Mediterranean, and is on the line of route to the Far East through the Suez Canal. It is a very important port of call on the Mediterranean route to the East.

Valetta, its chief harbour, is an important coaling station and fortress. It is used as a naval harbour for repairs to the British Mediterranean fleet.

The island produces oranges, figs, grapes, mandarines, potatoes and honey, but the exports are small.

Chief Imports.

Coal	£500,000	Meat & cattle	£116,000
Wheat	354,000	Cotton goods	87,000
Wine & spirits	147,000	Sugar	79,000

A very large part of the trade of Malta is with *Great Britain* and *British possessions*.

Balkan Peninsula.

The length and broken nature of the coast of the Balkan Peninsula give it great commercial advantages. The situation also is excellent for commerce, and the country in the past was noted for its sailors and explorers. The peninsula is split up among several states, of which Greece is best adapted for commerce. The chief ports are:—

Greece.

Pireus is the port of Athens, and ranks next in size to that town.

Patras and *Corinth*, on the gulf of the same name, export the currants of Greece, and are in easy communication with *Ægean Sea* through the *Corinth Canal*.

Hermopolis is on the island of Syra, and has an export of sponges.

Salonica is of importance as being the terminus of the Great Orient Express Route. It is increasing in importance rapidly.

Turkey.

Constantinople, on the Bosphorus, guards the passage between the Mediterranean and Black Seas, and thus has a commanding situation. The Golden Horn is a beautiful and very good natural harbour.

Gallipoli is the chief Turkish naval station. It is situated at the entrance to the Sea of Marmora on the Dardanelles.

Bulgaria.

Varna is the chief outlet for the Bulgarian trade in the Black Sea. It has good railway communication inland.

Burgas is a minor port to the south of Varna.

Rumania.

Galatz is an important grain port on the Danube.

Greece.

Chief Exports.

Currants . . .	£2,500,000
Wines . . .	700,000
Olive oil . . .	700,000
Sponges . . .	250,000

Chief Imports.

Minerals . . .	£1,000,000
Yarn & fibre . .	800,000
Animals & animal products .	300,000

The chief exports to the United Kingdom are currants, raisins, sponges, and olive oil.

The trade of Greece is mainly with *Great Britain, Russia, Austria-Hungary, and Germany.*

Turkey (Empire).

Chief Exports.

Fruits . . .	£3,500,000
Tobacco . . .	2,500,000
Animal products .	1,000,000
Drugs . . .	1,000,000

Chief Imports.

Textiles . . .	£11,000,000
Cereals . . .	4,000,000
Metals . . .	2,000,000

The trade of Turkey is mainly with *Great Britain, Austria, France, and Germany.*

Bulgaria.

Chief Exports.

Wheat . . .	£1,800,000
Attar of Roses . .	500,000
Maize . . .	300,000

Chief Imports.

Textiles . . .	£3,000,000
Machinery . . .	1,000,000
Timber . . .	000,000

Rumania.

Chief Exports.

Grain . . .	£22,000,000
Petroleum . . .	1,500,000
Timber . . .	1,000,000

Chief Imports.

Metals . . .	£5,000,000
Textiles . . .	3,600,000
Machinery . . .	2,300,000

The trade of Rumania is mainly with *Germany, Austria-Hungary, and Great Britain.*

Serbia.

Chief Exports.

Prunes . . .	£640,000
Meat . . .	620,000
Wheat . . .	600,000
Maize . . .	550,000

Chief Imports.

Cotton goods . .	£620,000
Hides . . .	240,000
Machinery . . .	220,000
Salt . . .	200,000

The trade of Serbia is mainly with *Austria-Hungary and Germany.*

Switzerland.

Switzerland has no seaboard and is difficult of access, but requires the import of food stuffs and raw materials, the latter for her silk, cotton, and watch industries. These are exported as manufactured goods, together with cheese and condensed milk.

Modern invention which has made possible the tunnelling of the Alps, has brought Switzerland into easier access with France, Germany, Austria and Italy, through which countries her products have to be brought.

Chief Exports.

Silk goods . . .	£11,000,000
Cotton goods . .	10,000,000
Clocks . . .	7,000,000
Animal products .	5,000,000

Chief Imports.

Cereals . . .	£9,000,000
Minerals . . .	5,000,000
Beverages . . .	2,500,000
Timber . . .	2,000,000
Fruits . . .	2,000,000

The trade of Switzerland is mainly with *Germany, France, and Italy.*

Austria-Hungary.

Austria-Hungary has only a short sea-coast on the Eastern Adriatic. This she has increased within recent years by the inclusion of Herzegovina, obtained from Turkey. On the Adriatic coast is the important Austrian port of *Trieste* and the Hungarian port of *Fiume*. This lack of coast-line is compensated for by the navigable Danube, by which both countries do much of their internal and some of their export trade. Austria-Hungary imports raw materials, coal, and machinery, and exports grain, flour, beet-sugar, cattle, eggs, timber, furniture, textile and iron goods.

Trieste is an important outlet for Austria and South-West Germany, being joined by rail to Vienna and Munich. Austrian ships trade with the Mediterranean ports and *viâ* the Suez Canal with the Far East.

Fiume is joined by rail to Budapest, and exports a large quantity of flour obtained from the wheat of the Hungarian Plain.

Chief Exports.

Cereals . . .	£13,000,000
Sugar . . .	12,000,000
Timber . . .	10,000,000
Eggs . . .	6,000,000
Glass . . .	3,500,000

Chief Imports.

Cotton (raw) . .	£14,000,000
Coal . . .	11,000,000
Wool . . .	6,000,000
Hides . . .	4,500,000
Machinery . . .	3,500,000

The trade of Austria-Hungary is mainly with

Germany, Great Britain, Italy and the United States.

EXERCISES.

1. Show why the opening of the Suez Canal made the ports of the Mediterranean more important.
2. Name the chief ports on the North Sea, and the inland region for which each forms an outlet. With what parts of the world does each trade?
3. Describe the physical features which cause Copenhagen, Gibraltar, and Constantinople to be important.
4. Why have the ports of the North Sea become so important during the last two centuries?
5. Which countries of Europe have to import the most food stuffs? Give reasons. Why is Holland an important trading nation?
6. From what disadvantage does Russia suffer in her maritime commerce? From whence does she obtain many of her supplies?
7. Name the chief Mediterranean fruits and the areas from which they are obtained.
8. What is meant by the term "Baltic produce"?
9. From which parts of Europe are the following exported: Oranges, flax, matches, iron, linen, wheat, macaroni, sherry, prunes and lemons?
10. What are the chief areas for the following products: Olive oil, sardines, attar of roses, currants, gin, brandy and port?
11. France imports wool, raw cotton, hides, oil seeds, coffee and flax. Give the possible sources of each of these materials.
12. Show by means of a graph the value of the British export of machinery to Germany—

1905	.	.	£2,100,000
1906	.	.	2,150,000
1907	.	.	2,300,000
1908	.	.	2,140,000
1909	.	.	1,730,000
1910	.	.	1,840,000
1911	.	.	1,950,000
1912	.	.	2,100,000

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER V.

ASIA.

CONTENTS.

World Position and Size — Seas, Coasts, Islands.
Surface.
Climate
Vegetable Products — Animals.
Minerals.
Manufactures
Routes — Seaports.
Commerce.
Population and Peoples.

MAPS.

38-41. Climatic Maps.
42. Vegetation Zones.
43. Vegetable and Animal Products.
44. Minerals and Manufactures.
45. Routes.
46, 47. Population and Political.

World Position and Size.

Asia reaches from the Equator to within 12 degrees of the Pole. From Asia Minor, the peninsula in the far west, to the islands of Japan in the extreme east it stretches through over 120 degrees of longitude. Its area is roughly 17,000,000 square miles, or nearly five times that of Europe.

As the continent reaches practically from the Poles to the Equator, it must experience the climates of all regions, from those of the barren Arctic plains to tropical lands.

Seas, Coasts, Islands.

Fig. 18 shows, unshaded, that part of Asia which is more than 400 miles from the coast. Compare this with fig. 14, showing a similar unshaded area in Europe, and notice that, while a great part of Europe is within easy access of the sea and feels its equalising influence, Asia is a huge compact mass, and a great portion is far removed from the sea, feeling no equalising influence, and having little access to it.

The eastern coasts of Asia may be compared with the western shores of Europe.

Both have an important island nation (Japan and Britain) separated from the mainland by a narrowing sea.

Both coasts have a low plain watered by long rivers and supporting dense populations.

There is a marked resemblance between the southern shores of Europe and Asia. The block-plateau of Spain, with Gibraltar forming the gateway to the Mediterranean, resembles that of Arabia, with Aden at its western entrance. Italy, in the Central Mediterranean, in some respects resembles India, while the naval station of Malta is repeated in that

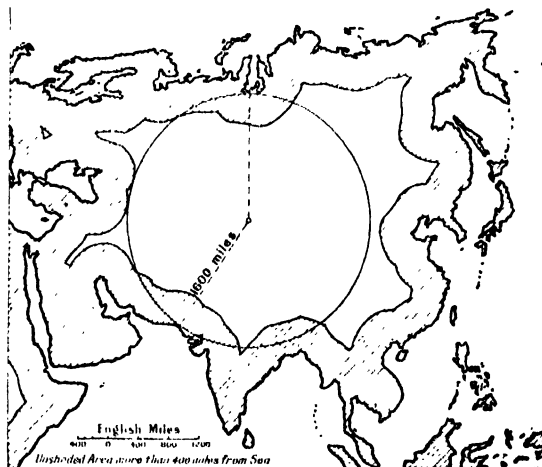


Fig. 18.

of Colombo in the island of Ceylon. The Malay Peninsula and Indo-China occupy a similar position to that of the Balkan Peninsula, and Singapore, guarding the gateway at the eastern extremity resembles Constantinople.

EXERCISES.

1. Explain why the north coasts of Asia are of little use commercially.
2. Explain why Aden, Singapore, and Colombo are important British possessions, and compare their positions with three similar ports in the south of Europe.
3. Draw a map of the eastern coasts of Asia, naming the seas washing the shores and the festoons of islands which enclose each.

Surface.

The *Pamir Plateau* is the central core from which all the mountains of Asia radiate, and hence it is sometimes known as the "Roof of the World." From this plateau it is possible to trace three distinct lines of mountain folds.

The *first* line of folds is shown in the *Tian Shan Mountains*, the *Altai Mountains*, the *Yablonoi* and the *Stanovoi Mountains*, and is continued across Bering Strait into North America. The same fold is continued westward through the *Caucasus*, and forms the mountain axis of Europe.

The *second* line of folds is represented by the *Pontic*, *Elburz*, *Hindu Kush*, *Pamir*, and *Kuen Lun Mountains*.

The *third* line of folds can be traced through the *Taurus*, *Zagros*, *Sulaiman*, *Himalaya*, and the mountains of Further India and the Malay Peninsula.

North of the first line of folds the land gradually slopes to the *Plain of Eurasia*. Between the first and second lines of folds are a number of depressions. Find on the map the *Black Sea*, *Caspian Sea*, and between the *Tian Shan* and *Kuen Lun Mountains* the *Tarim* depression.

Between the second and third folds are three lofty plateaux. Find on the map *Asia Minor*, between the *Pontic* and *Taurus Mountains*, *Iran*, between the *Elburz* and *Zagros Mountains*, and *Tibet*, between the *Kuen Lun* and the *Himalaya Mountains*.

South of the third fold are plains, and in the far south are two important tablelands, *Arabia* and *The Deccan*. On the map find the *Plain of Mesopotamia*, drained by the *Euphrates* and *Tigris*, the *Plain of Northern India*, drained by the *Indus* and *Ganges*, and the coastal plains of Further India.

In the east the mountains form either a continuation of the folded mountains to the coast or steep eastern edges of the plateau. The rivers draining to the east descend from the gorges which they cut across these plateaux to the coastal plain, where they overflow.

A volcanic chain of mountains borders Eastern Asia, and runs from *Kamchatka* through the *Kurile*, *Japan*, and *Philippine Islands*, causing all these to have a volcanic soil and steep mountain cones.

From this general study of mountains it is possible to separate Asia into the following natural divisions:—

- (1) The Northern Lowlands.
- (2) The Central Mountain Mass.
- (3) The Southern Plains and Tablelands.
- (4) The Eastern Plains.
- (5) The Eastern Volcanic Islands.

Northern Lowlands.

Notice that from the most northern of the three lines of folds there is a gradual slope to the north, across which flow long rivers, the *Obi*, *Yenisei*, and *Leua*. In the south west the rivers *Amu* and *Sir* flow to a depression known as the *Sea of Aral*, and this part of the plain is called *Turan* or Russian *Turkestan*, and is distinct from the great *Siberian Plain*, where the rivers flow northward to the *Arctic Ocean*.

Central Mountain Mass.

This occupies a larger area and contains higher peaks than any other mountain mass in the world. From the *Pamirs* the mountains widen out in the east to cover the greater part of the continent. South of the north-west trend of the first line of folds is the *Tarim Depression* continued by the *Desert of Gobi* or *Mongolia*, and south of the *Kuen Lun*, between this and the mighty *Himalayas*, is the great *Plateau of Tibet*. The mountain ranges along the coast are either continuations of these ranges (as the *Peling Mountains*) or the brink edges of the plateau. West of the *Pamirs* the mountain mass does not include nearly such a large area: the northerly line of folds is missing in places, and the two remaining folds are separated by the *Plateaux of Asia Minor* and *Iran*.

The *Amur* rises on the *Plateau of Mongolia*. The river flows north of the *Khingan*

Mountains, and then forms the northern border of Manchuria. In its lower course the river trends in a north-easterly direction, emptying into the Sea of Okhotsk.

Tibet is a high plateau, 3 miles high, shut out from all sea influence and elevated into the upper layers of the atmosphere. It is intensely cold, and only in the sheltered valleys is vegetation possible. Many rivers cut great V-shaped gorges across the plateau. In the north the *Hoang-Ho* flows north-east to the Yellow Sea. In the south the sources of the *Yang-tsi-kiang*, flowing to the China Sea, and the *Mekong*, *Salwin*, and *Irawadi* are close together with their upper courses parallel, but the *Yunnan Plateau* turns the Yang-tsi-kiang to the east, while the others flow south through Further India.

The *Himalayas* form the southern border of the Plateau of Tibet, separating it from the *Indo Gangetic Plain*. From the latter they rise like a gigantic wall, 4 to 5 miles high, forming the loftiest range in the world, but descend on the northern side to the Tibetan Plateau. They consist of a number of parallel ranges separated by longitudinal valleys. Everything in the Himalayas is on a gigantic scale, and forms a scene of impressive grandeur. Impenetrable forests of tropical trees clothe the slopes, and above these rise snow-clad peaks. The vast glaciers which are formed in the upper valleys give rise to roaring torrents, which, rushing through gorges of great depth, eventually find their way to the plain, carrying to it vast quantities of rich alluvium, and forming the feeders of such large rivers as the *Indus*, *Ganges*, and *Brahmaputra*. *Mt. Everest*, 29,000 feet, the highest mountain in the world, is only one of a group of peaks nearly as high.

The parallel ranges of the Himalayas bend round to form the surface of Indo-China. This consists of a corrugated structure of parallel ridges and valleys. The rivers flow through thickly forested valleys, and overflow when they reach the low lands at their mouths, forming fertile deltas. The chief rivers of this southern peninsula are the *Irawadi* and *Salwin*, which flow to the Bay of Bengal west of the Malay Peninsula, the *Menam*, flowing to the Gulf of Siam, and the *Mekong* farther east. The ridges separating these valleys and the dense im-

penetrable forests make routes across the country difficult.

Asia Minor consists of a plateau bordered on the north by the Pontic Mountains and on the south by the Taurus and Anti-Taurus Mountains which rise in the east to the *Armenian Mountains*. The general slope of the plateau is to the west. Between the Taurus and Anti-Taurus Mountains is the *Cilician Gate*, which allows of routes from Asia Minor being taken into Arabia and to the Persian Gulf. Separated from the Taurus ranges by the *Syrian Gate* are the *Lebanon* and *Anti-Lebanon* ranges, which run parallel to the coast. These two ranges are parted by a narrow rift valley, in which lies the *Dead Sea* with the river *Jordan*.

Southern Plains and Tablelands.

South of the central mountain mass are two well-watered plains—the *Plain of Mesopotamia*, between the Plateaux of Arabia and Iran, drained by the *Euphrates* and *Tigris*, and the *Indo-Gangetic Plain*, between the Himalayas and the Plateau of the Deccan.

Arabia forms a block-tableland in the south-west, rising gradually to a steep brink edge in the west.

Indo-Gangetic Plain.

This plain is occupied by the basins of the *Indus* and *Ganges*, connected by the *Gate of Delhi*. Notice the *Aravalli Hills*, which run northward from the Deccan in the south nearly to meet the Himalayas, and thus divide the Ganges and Indus basins.

The *Indus* rises on the northern side of the Himalayas, and flowing north east in a longitudinal valley breaks through the ridges on the north-west, and flows south-west parallel to the Sulaiman Mountains. All its tributaries are in the upper part of its course, where the *Jehlam*, *Chenab*, *Ravi*, and *Sutlej*, rising in the Himalayas, flow across the *Punjab*. The main stream forms a delta on the Arabian Sea.

The *Ganges* rises in the Central Himalayas and flows south-east to the Bay of Bengal, where it forms a large delta. It receives the *Jumna*, *Gumti*, and *Gogra* from the slopes of the Himalayas and the *Chambal* from the northern edge of the Deccan Plateau.

The Deccan is a block-tableland similar to that of Arabia, but with its gradual slope to the east. The *Western Ghats* form a steep brink edge, but the *Eastern Ghats* are much lower. Most of the rivers draining the plateau flow eastward through inaccessible gorges to a rich, fertile plain, broadest in the south, where it is known as the *Carnatic*. The chief rivers draining to the east are the *Mahanadi*, *Godavari*, *Kistna*, and *Kaveri*. In the north-west the *Narbada* and the *Tapti* flow to the west coast.

Ceylon, in the south, is a continuation of the rock structure of the mainland, being highest in the south-west. Notice the small islets in Palk Strait. These are the connecting links with the mainland, and make it necessary for ships to go south of the island rather than through the Strait.

Eastern Mountains and Coastal Plains.

Eastern Asia consists of a number of mountain ranges separating rich river plains. In the north-east, south of the Amur estuary, is a steep mountain ridge bordering the coast, with its gradual slope inland. This ends in the *Peninsula of Korea*, and between this and the Khingan Mountains, which form the edge of Mongolia, lies the *Plain of Manchuria*. South of this the Hoang-Ho, from Northern Tibet, makes a fertile plain, which is separated from the Yang-tsi-kiang by the *Tsinling Mountains* and the mountainous *Shantung Peninsula*.

The eastward extension of the Tibetan ranges causes South China to be hilly, and these hills separate the Yang-tsi-kiang from the *Plain of the Si-kiang*, while south of that the mountains form a steep border along the shores of Annam.

The Japanese islands form a volcanic chain with their gradual slope to the open ocean. The islands of the East Indies are mountainous and mostly volcanic. Sumatra, Java, and the smaller islands which continue in the same direction have their steep slope on the south. Borneo and Celebes are mountainous, and the Philippines volcanic.

EXERCISES.

1. Why are the rivers draining the Siberian lowland of little use commercially? Draw

a contrast between the basins of the Obi and Yenesei.

2. Why do the rivers of China and the Deccan overflow only in their lower courses? State the sources of each of these rivers, and show whence they obtain the supply of water which feeds them in their upper courses.
3. Describe the Indo-Gangetic Plain and the rivers draining it. Show why Delhi is important.
4. Describe the structure of Further India. Show why routes across it are difficult.

Climate.

Carefully study Map 38, showing the isotherms for January, and notice the following:—

The parts of Asia having a temperature below 32° F., or freezing point, and those below 0° F. Also the part having the lowest temperature.

The temperature in January of the central mountain mass. Here it must be noted that the temperatures are all reduced to sea-level, and that the actual temperatures taken on the plateau would be very much less.

Trace the isotherm of 80°, and notice which land masses it passes through.

Compare Map 38 with the July Isotherm Map 39, and notice the following:—

The difference between summer and winter temperatures in Asiatic Russia. Name the parts having the greatest range of temperature.

The direction of the isotherm of 80°, and the parts which have a greater temperature than 80° F., also those having a higher temperature than 90° F.

The temperature of the Indian Ocean on the south and the parts having a temperature less than 80°.

On the east coast the isotherms of winter bend southward over the land and northward over the sea, and that their direction is exactly reversed in winter.

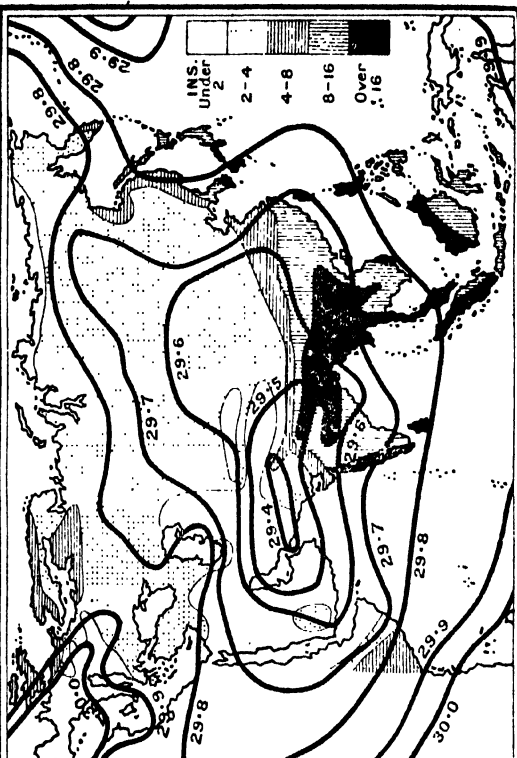
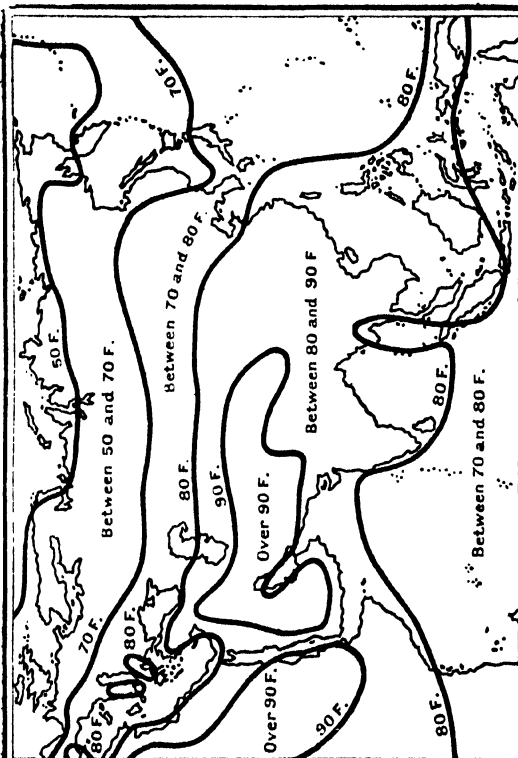
Map 40 shows the winter rainfall of Asia. Notice on this map the following:—

That a great part of Asia has little or no rain in summer.

That the countries bordering the Mediterranean have winter rains.

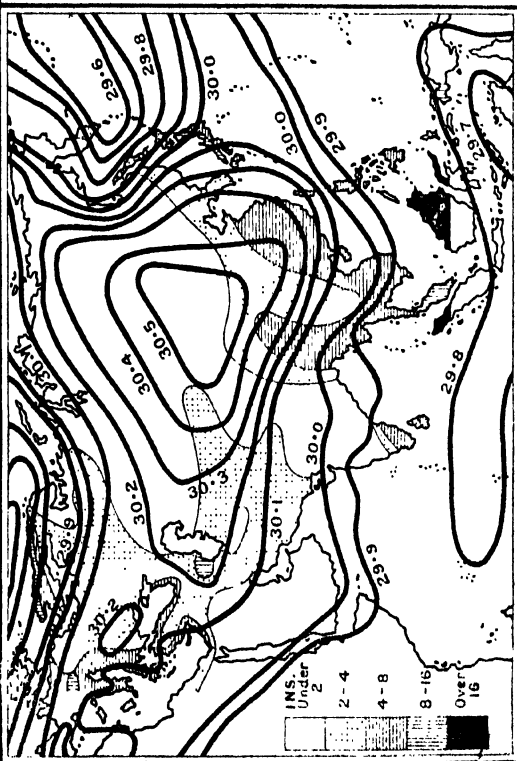
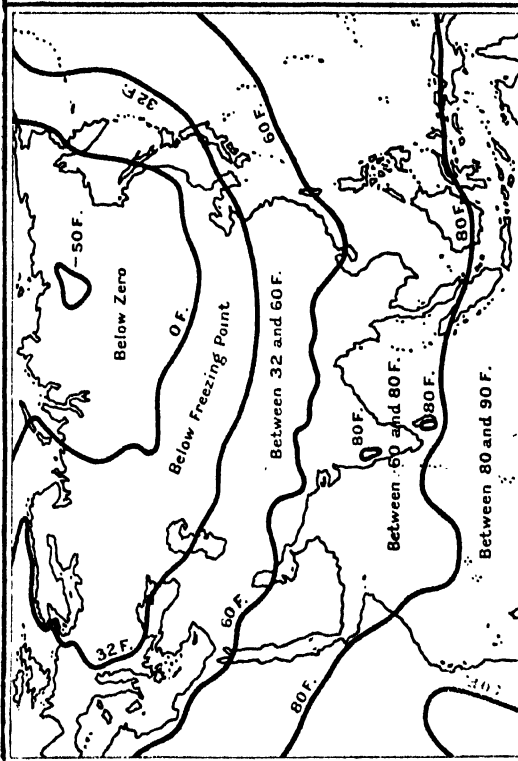
That South East India, Ceylon, and Eastern Asia get a winter rainfall, which increases in the south over the East Indies.

JULY ISOTHERMS.



SUMMER RAINFALL AND ISOBARS.

JANUARY ISOTHERMS.



WINTER RAINFALL AND ISOBARS.

Compare Map 40 with the summer rainfall conditions shown in Map 41, and note the following:—

- That most of Asia gets its rainfall in summer.
- That, except in the south-west, the countries bordering the Pacific and Indian Oceans have a heavy rainfall.
- That the countries bordering the Mediterranean have less rain than in winter.

Gathering together all the information thus obtained from these maps, we can divide Asia into the following climatic regions:—

1. *Mediterranean Asia*, having a warm, wet winter with most of its rain during this season, and a summer dry and hot.
2. *Russian Asia* or *Siberia*, with great extremes of temperature and little rain, which falls chiefly in summer.
3. The *Central Mountain Mass*, devoid of rain, and therefore consisting chiefly of deserts.
4. The *South and East Marginal Lowlands*, with most of their rain in summer.

The south and east marginal lands of Asia are subjected to monsoon winds. Into these in summer, winds from the sea blow spirally inwards, causing rain, while in winter, winds blow outward from the land, and are mostly dry.

EXERCISES.

1. Name the parts of Asia which have the greatest, and those having the least, range of temperature.
2. Name the parts of Asia which have the heaviest winter rains, and those having the heaviest summer rains. Give reasons for your answers.
3. Name the parts of Asia having the least rainfall throughout the year. Give reasons in each case.
4. Why has the Great Plain of Asiatic Russia a more extreme climate than the Plain of Western Europe?

Vegetation.

As Asia reaches from the Arctic regions to the Equator all varieties of flora and fauna are found. In the north, bordering the Arctic Ocean, are the cold, barren *Tundras*, where no vegetation except lichens and mosses is possible, and where the inhabitant is a wandering hunter eking out a precarious existence. The *Tundra* on the south gives

place to coniferous and deciduous *forests* which spread across Russian Asia from east to west, and contain numerous fur-bearing animals. The interior lands are either grassy *steppes*, upon which nomadic shepherds wander with their flocks and herds to find fresh pastures and supplies of water, or *deserts*. Along the shores of the Mediterranean, products similar to those of Southern Europe are found. In the summer-monsoon areas of India and Burma there are forests of tropical trees, while tropical products are grown on the well-watered plains and fertile slopes of the hills. On the eastern coastal plains the dense populations of China and Japan grow tropical and other products on their flooded plains and on the hill slopes.

The equatorial lands of the East Indies and the Malay Peninsula grow quantities of *rubber*, in addition to other products, on their rich, volcanic soil.

The *Tundra* of the north is crossed by the rivers flowing from the northern fold of the Asiatic ranges across the Siberian Plain to the Arctic Ocean, and these in their lower courses overflow in summer, causing desolate wastes. The thawing of the ice-bound rivers also sets free quantities of fresh-water fish, upon which the inhabitants feed.

The rivers flowing north to the Arctic Ocean are of little use for carrying timber in the forest areas, although Russia is developing the *timber* industry. The forests here form the richest *fir* preserve in the world. The chief trees are coniferous and deciduous, similar to those of Europe.

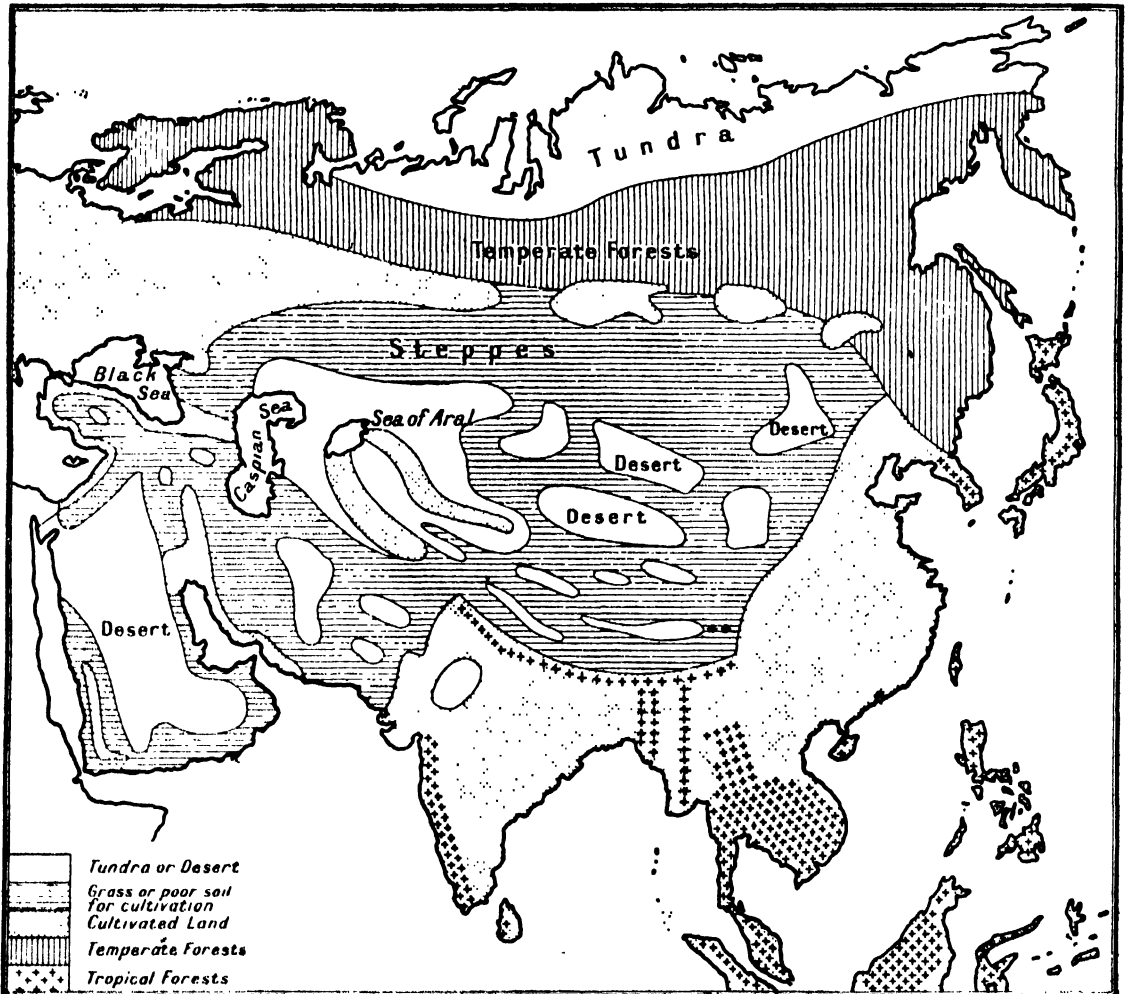
The *Steppes*, or grass lands, are due chiefly to the want of water and extremes of climate. In some parts, as in Russian Turkestan or 'Turan, these steppe lands are being irrigated and made capable of supplying large quantities of raw products, especially *cotton*.

A *great belt of deserts* stretches from Mongolia and Tibet across Asia to Arabia, and is continued from there into Africa. In Persia the only fertile areas are in the mountain valleys, the rivers when they reach the plain drying up in the sandy wastes, e.g., the Helmand, running into the Seistan Depression.

The *southern marginal lands*, including India and the Malay Peninsula, lie for the greater part within the tropics, and are subject to summer rains. The wet western slopes of the Western Ghats, the Himalayas, and the ridges of Further

India are covered with dense tropical forests, yielding *teak*, *mahogany*, and *dye woods*. The well-watered plains of the Carnatic bordering the Deccan on the east, the basin of the Ganges and the flood plains of the south-east peninsula are well watered tropical lands, supporting dense populations, while the

supply she requires. Japan has a poor soil, which is now utilised to the fullest extent to support the dense population. The island of Formosa has in the mountainous east a forest of trees which yield *camphor*, its lower western plains growing similar crops to those found on the mainland opposite.



Map 42. ASIA—VEGETATION ZONES.

irrigated lands of the Upper Indus and the rich, black lands of the Deccan grow *wheat* as a winter and *cotton* as a summer crop. The rich flood plains of the eastern rivers grow large quantities of *cereals*, and the hill slopes of South China produce *tea*. Manchuria is being rapidly developed, and will probably be able to provide Japan with the additional food

The *East Indies* have a very rich soil, and under Dutch government have been well cultivated, producing *coffee*, *sugar*, *tobacco*, *pepper*, and *spices*. The demand for rubber has caused the rise of highland rubber plantations, and, when developed, these islands and the neighbouring Malay Peninsula will probably meet a large part of the demand.

Grains.

Wheat is grown in large quantities in the irrigated lands of the Upper Indus and upon the Deccan, in both places as a winter crop. The development of Manchuria within recent years has caused a large production of wheat, and this is cultivated largely by the overflow population of China which has pushed into Manchuria, and even into Mongolia. In Asia Minor, Syria, and south of the Caucasus small quantities of wheat are grown, but the irrigation of the Plain of Mesopotamia would convert this into a highly productive wheat-growing area not far removed from the dense populations of Europe, where its productions would find a ready market.

Maize and *millet* require more moisture than wheat, and are grown on the flood plains of China, Japan, the Ganges Basin, and the eastern coastal plain of India. Millet though requiring moisture, will thrive in a much poorer soil than maize.

Rice is the product of flood plains of rivers, and hence is grown in the Lower Ganges Basin, on the plains of the Carnatic (where the rivers have flowed in gorges across the plateau and break loose on the plain), in the river plains of the south-eastern peninsula, and on the flood plains of China, especially in the north. The export of rice from Asia is very small in comparison with the amount grown, but it must be remembered that the people of these lands are vegetarians and rice forms their staple food.

Tea, Coffee, Cocoa.

Tea and *coffee* require a well-drained slope with a warm climate free from frost. The coffee plant is more delicate than the tea plant, and therefore the area where it will thrive is more limited.

Tea is grown largely on the hill slopes of Assam east of the Ganges Basin, and also in Ceylon, where it has almost taken the place once occupied by coffee. Tea is also obtained from Southern China in large quantities.

Coffee is grown extensively on the slopes of the Western Ghats, in Ceylon, and the East Indies. It is also cultivated on the steep slopes of the Arabian Plateau.

Cocoa, obtained from the cocoa plant, is grown in Ceylon and the Dutch East Indies.

Pulses.

The majority of the people living in monsoon lands are vegetarians, and peas, beans, and other pulses supply, with rice, the nutriment which flesh-eaters obtain from meat. Beans are an important product of Manchuria, Japan, and Northern China, and are also grown in the Indus Basin.

Sugar.

This, obtained from canes, is an important product of South-East China, Siam, Annam, and the East Indian Islands, especially Java.

Tobacco and Opium.

These are both grown in large quantities in Asia. The former is obtained from the Mediterranean lands of Asia Minor, Syria, and Persia, in addition to the monsoon lands of China and Japan. The tobacco grown in the East Indies, especially Borneo, is used in the manufacture of cigars. India produces more *opium* than any other country, and exports it to China, though some is grown in that country. The export of Indian opium is now decreasing owing to agreements between the British and Chinese Governments.

Textile Products.

Cotton.—The rich, black lands of the Deccan, capable of holding moisture, produce a large amount of raw cotton, some of which is manufactured in India, but a great part is sent to the cotton mills of Lancashire. Smaller quantities are produced as a summer crop in the Indus Basin. In North China there are extensive cotton fields. In Russian Turkestan the irrigation of the rivers running to the Sea of Aral has caused an increased growth of cotton, which is exported to the coalfields of European Russia. Cotton and other seeds yielding oil are an important product of India.

Silk is a very important product obtained from all parts of China and Japan, and now sent in its raw state to be manufactured in Europe. In addition to this, Japan herself manufactures large quantities.

Jute is a product of the wet tropical lands, and is grown chiefly in the Ganges Basin.

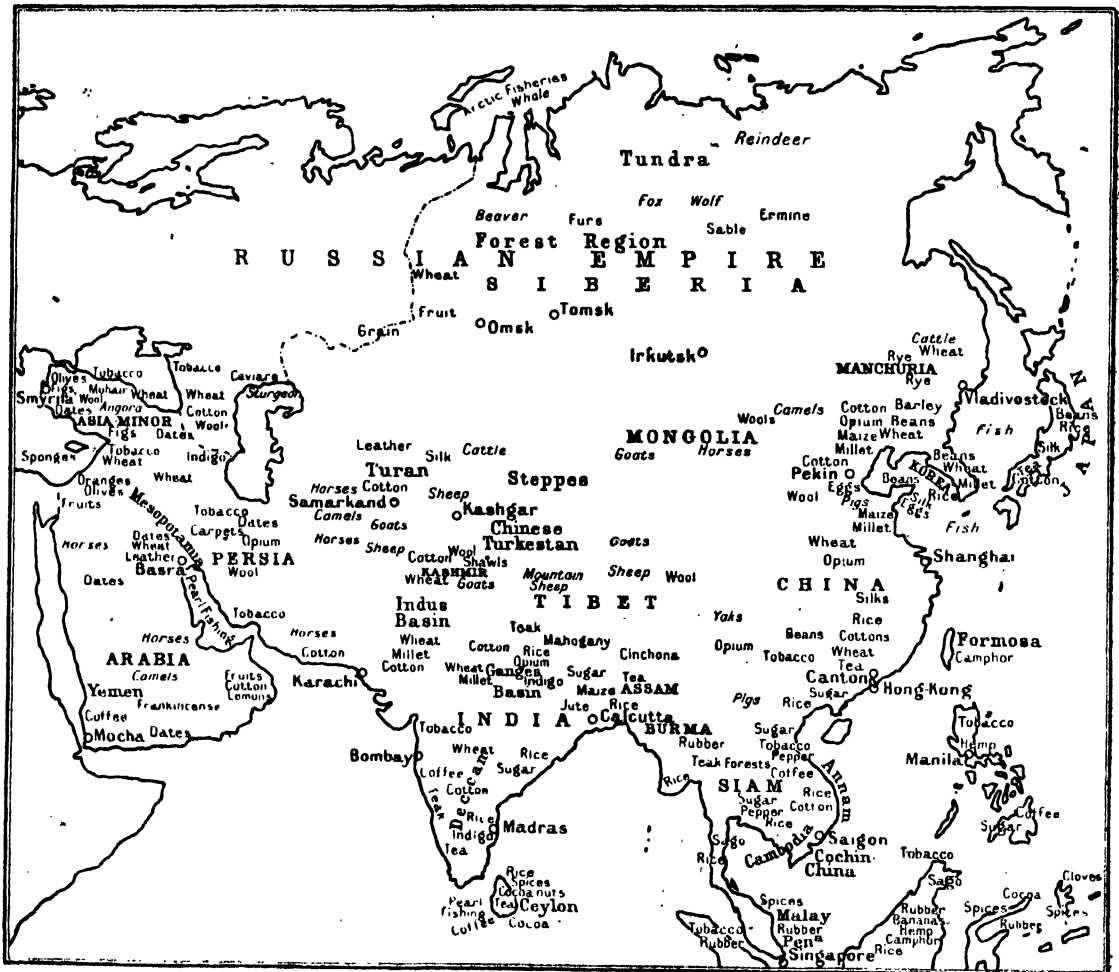
Indigo, although not a textile product, is used largely in dyeing textiles. It is grown in the tropical flood plains of the

Ganges Valley and Southern China. The modern use of coal-tar dyes is decreasing the demand for indigo.

Products of Lesser Importance.

Cocoanuts, obtained from Ceylon and the East Indies, are rapidly increasing in

Fruits.—The Mediterranean lands produce quantities of subtropical fruits, including oranges, grapes, and olives. Dates are plentiful in the drier lands of Persia and Arabia. Fruits, such as the banana, requiring a hot, damp climate are grown in the East Indies.



Map 43. ASIA—VEGETABLE AND ANIMAL PRODUCTS.

importance, owing to the demand for the oil obtained from them.

Sago is obtained from the pith of a palm tree which grows in the Malay Peninsula and the Dutch East Indies. It is the staple food of the natives, and is easy to cultivate.

Peppers, spices, nutmegs, and cloves are largely obtained from the Malay States and East Indian Islands.

Animals.

The Russian forests are rich in fur-bearing animals, of which the chief are the *beaver, sable, ermine, fox, and wolf*. The *tiger* is found in South and Eastern Asia, while the *rhinoceros and elephant* live in the south. *Wild horses and camels* are found in Central Asia, and the mountain sheep on the Pamirs pro-

vide game for hunters. The *reindeer* is the domestic animal of the Tundras, and the *camel* is of the greatest importance in the desert. In India and China cattle are kept for draught purposes, while in India and Indo-China the tame elephant is also used. In Western Asia donkeys and mules are common. Arabia and Persia are noted for their *horses*. Grazing animals, including cattle, horses, sheep, and goats, are the wealth of the Steppe dweller of Central Asia. In the densely peopled lands of India and China the fertile soil is used for agriculture, and pasture land is scarce. In North-West India *goats* and *sheep* are plentiful in Kashmir, and these are also found in Persia and Asia Minor, where the wool causes a carpet industry. *Pigs* and *fowls* in China and India are common.

Pearl fisheries are important in the tropical seas, especially to the south of Ceylon, while the Arctic whale and other large fish of the northern seas are hunted for the sake of their oil. Valuable fisheries exist off the coasts of China and Japan, while salmon and trout are obtained from the Japanese rivers.

EXERCISES.

1. Name the chief steppe lands of Asia. Give the position of each, and the reason why cultivated products are not grown there.
2. Name the chief forest areas of Asia, both temperate and tropical. Name the chief trees found in each. Why is fur a greater export from the former than timber?
3. Where is irrigation carried on in Asia? Show how irrigation works in the basins of the Euphrates and Tigris would convert that region into a productive area.
4. Describe the chief vegetable products of monsoon lands. Explain why pasture animals are not found in these lands.
5. Upon what climatic and other conditions do the growth of (a) tea, (b) coffee, (c) cocoa depend? Name the chief parts of Asia where each is produced.
6. Upon what climatic and other conditions does the growth of cotton depend? Name the regions in Asia where it is grown. Show where in Russian Asia large quantities are grown with the help of irrigation.
7. Why are rice and beans important productions of monsoon lands?

Minerals.

Asia has rich supplies of both industrial and precious minerals, but many of these remain undeveloped. The *coalfields* of China alone occupy twenty times the area of the total European coalfields, and there are valuable supplies in the islands of Japan. India possesses several rich coalfields, and the mineral is also found in Burma, Siberia, and the Caucasus. *Iron-ore* is found in China, Japan, and Russian Asia. The richest deposits of *tin* in the world are mined in the Straits Settlements and the East Indies, while rich supplies of *copper* are obtained from Yun-nan in South China, Asiatic Russia, and Japan. *Gold* is mined in the region of Lake Baikal, and in smaller quantities in Burma and India. *Silver* is obtained from the Altai Mountains, *rubies* from Burma, and *turquoises* from Persia. Valuable supplies of *petroleum*, second only to those of the United States, are found on either side of the Caucasus, in Burma, and the East Indian islands of Sumatra and Java.

Notice on Mineral Map 44 the position of the Chinese coalfields:—

- (a) The Mountains of Shansi, near the great northern bend of the Hoang-ho.
- (b) In the Shantung Peninsula.
- (c) and (d) In the Yang-tsi-kiang Basin.

In the first of these there are rich supplies of *anthracite coal* near to the surface. This could easily be mined, and is only awaiting the advent of railways for development. With this coal is found excellent iron ore.

Find on the map the Yun-nan Plateau, where the Yang-tsi-kiang turns eastward. This is rich in *copper*. China has supplies of *zinc* and also *quicksilver*.

Japan is equally rich in coal, which is distributed through all her islands, but the iron here is away from the coal supply. The excellent railways of Japan are overcoming this difficulty. *Copper* and *antimony* are also found in Japan.

The full development of the rich resources of China and Japan would not only provide work for the dense populations, but should cause a large manufacturing region able to compete with the manufacturing areas of Western Europe.

India has *coal* supplies in the Ganges Basin and on the north-east edge of the Deccan Plateau. *Gold* is mined in the Western

Ghats, and *copper* is plentiful in the Himalayas. *Salt* is obtained chiefly by evaporation. *Graphite* is an important product of Ceylon.

In Further India and the East Indies there are, in addition to rich deposits of *tin* and *petroleum*, supplies of *gold* and *precious stones*, of which the chief are *rubies*.

In the north-east of Siberia is a rich mineral-producing region. *Gold* is found round the shores of Lake Baikal and in the basins of the Amur and Yenesei, and in the latter basin *graphite*. *Iron ore*, *lead*, *copper* and *coal* are obtainable, the last named being of poor quality.

In addition to the petroleum found on either side of the Caucasus, there are deposits of *manganese*, *copper*, *iron ore*, and *coal*, which latter has only recently been developed.

Borax, a compound of boracic acid and soda, is found in the dry regions of Tibet, China and Persia.

Manufactures.

These are not at present important in Asia. The great central mountain mass, which occupies a large part of the continent, and the desert areas can never support a manufacturing people. Asia Minor, Syria, and Mesopotamia are badly governed, and the insecurity of property under the Turkish rule prevents any development of manufactures. China and Japan have only during the last century come into contact with the civilisation of Western Europe and America. Japan is rapidly increasing her manufactures, and with the full development of China's mineral store that country should be able to support its dense population by manufacturing textiles and other goods. The forested gorges of Further India and the hot, damp river plains have inhabitants entirely unsuited for manufacturing. India has for centuries been noted for its skill in hand-weaving and articles made in ivory, brass, copper, silver, and gold. During recent years cotton, silk, and jute factories have been established in Bengal and Bombay.

The Japanese have during recent years adopted Western ideas. Railways, telegraphs, modern textile and other machinery have been introduced. The coalfields have been fully developed and foreign trade encouraged. Cotton and silk spinning and weaving are important

manufactures, and woollen goods, paper, and matches are manufactures of lesser importance.

China is, like Japan, adopting Western ideas and modern machinery in its silk factories and in the leaf-rolling machines for tea. Cotton mills on the latest plans have sprung up in the large towns, and extensive iron and steel works have been opened. At present the population here is so large that numbers of Chinese emigrate, but the full development of manufacture would create work for all China's millions of people.

The rich tin deposits have caused *tin smelting* works at *Singapore*, and in the province of Wellesley on the Malay Peninsula.

Indian carpets and *rugs*, *figured silks*, and *metal ware* are still made by hand, but in the factories *coarse cotton goods* are made, while the jute, made into *gunny bags*, is sent largely to Australia and the United States.

In Asia Minor there are small *silk industries*, and in Syria, dependent upon the olive, a small *soap* manufacture. Cotton manufactures are commencing in Russian Turkestan consequent upon the growth of cotton on the irrigated steppe land.

EXERCISES.

1. Japan has developed her manufactures largely during the last century. Name the chief manufactures and show upon what natural products they depend.
2. China has such a dense population that large numbers have to emigrate to other lands. Show how the development of her mineral wealth would provide work for her dense population.
3. What are the chief textile industries of India? Upon what natural products do they depend?
4. Draw a map of Russian Asia, and insert in it the chief mineral deposits.
5. State the localities noted for copper, gold, tin and petroleum.

Routes.

Railway development has proceeded rapidly during the last fifty years. Russia has not only carried her railways into the interior of her Asiatic Empire to tap its rich resources, but has extended the line to the Pacific coast, which will enable her to trade in the markets of both East and West. Railways have been carried through the fertile Plain of Manchuria

and along the western shores of Korea. Long lines of rail have been constructed in China and Japan, and further construction in the former country will open up rich supplies of mineral and other productions. Britain has built in India miles of rail, which allow of easy communication between each part; while Germany is largely responsible for a new line which crosses Asia Minor from Scutari, opposite Constantinople, and is being extended to the Persian Gulf.

Caravan routes are still the chief means of communication in the central mountain area, and these follow the natural paths of least resistance.

Trace the following routes and notice where the railways make use of surface features.

Trans-Siberian Railway.

Trace the railway from *Moscow* across the low plain of the Obi *viâ Omsk* and *Tomsk* to *Irkutsk*, at the southern end of Lake Baikal. From there the railway follows the Shilka tributary of the Amur through Chinese Manchuria to the Russian port of *Vladivostok*. From *Harbin*, on this route, trace the line running south through Manchuria to the ice-free *Port Arthur*, at the end of the Liao Peninsula. Also notice the railway branching from this south of *Mukden*, and following the foot of the western slopes of Korea to *Seoul*, the capital, and *Fusan*, the port in the south. This latter railway is under Japanese control.

Trans-Caspian Railway.

From *Moscow* trace the line *viâ Orenburg* to the shores of the Sea of Aral, and then *viâ* the Sir river to *Tashkent* and *Samar-kand*. This railway is continued west again through *Bokhara* and *Merv* back to the Caspian, on the other side of which a line makes connection with *Moscow*. This railway not only enables Russia to carry to the manufacturing towns of European Russia supplies of the raw cotton grown on the irrigated steppes, but a branch line from *Merv* carries the route to the borders of Afghanistan. Notice on the map how the Indian railways to *Peshawar* and *Quetta* are only separated from those of Russia by the Hindu Kush. Thus the railways of the two European nations holding the greatest sway in Asia nearly meet each other, being only separated by the mountain mass of Afghanistan.

Routes of Turkish Asia.

Find Constantinople on the map. On the opposite shore of the Bosphorus is *Scutari*, and from here a railway has been constructed across Asia Minor, and also a line from *Smyrna* to join it. This railway is now being constructed through the Cilician Gate between the Taurus and Anti-Taurus to *Adana*, and from thence is projected to follow the Upper Tigris Valley to *Bagdad*, and *viâ* the Lower Euphrates to *Basra*, on the Persian Gulf. This line, when complete, will make a shortened overland route to India, ocean steamers only being necessary from *Basra* to the Indian ports.

A railway now connects *Aleppo viâ Damascus* to *Medina*, on the west coast of Arabia, and this line will be continued to *Mecca*.

A branch from *Damascus* leads to *Beirut*, on the coast, and a line connects the port of *Jaffa* with *Jerusalem*.

Indian Railways.

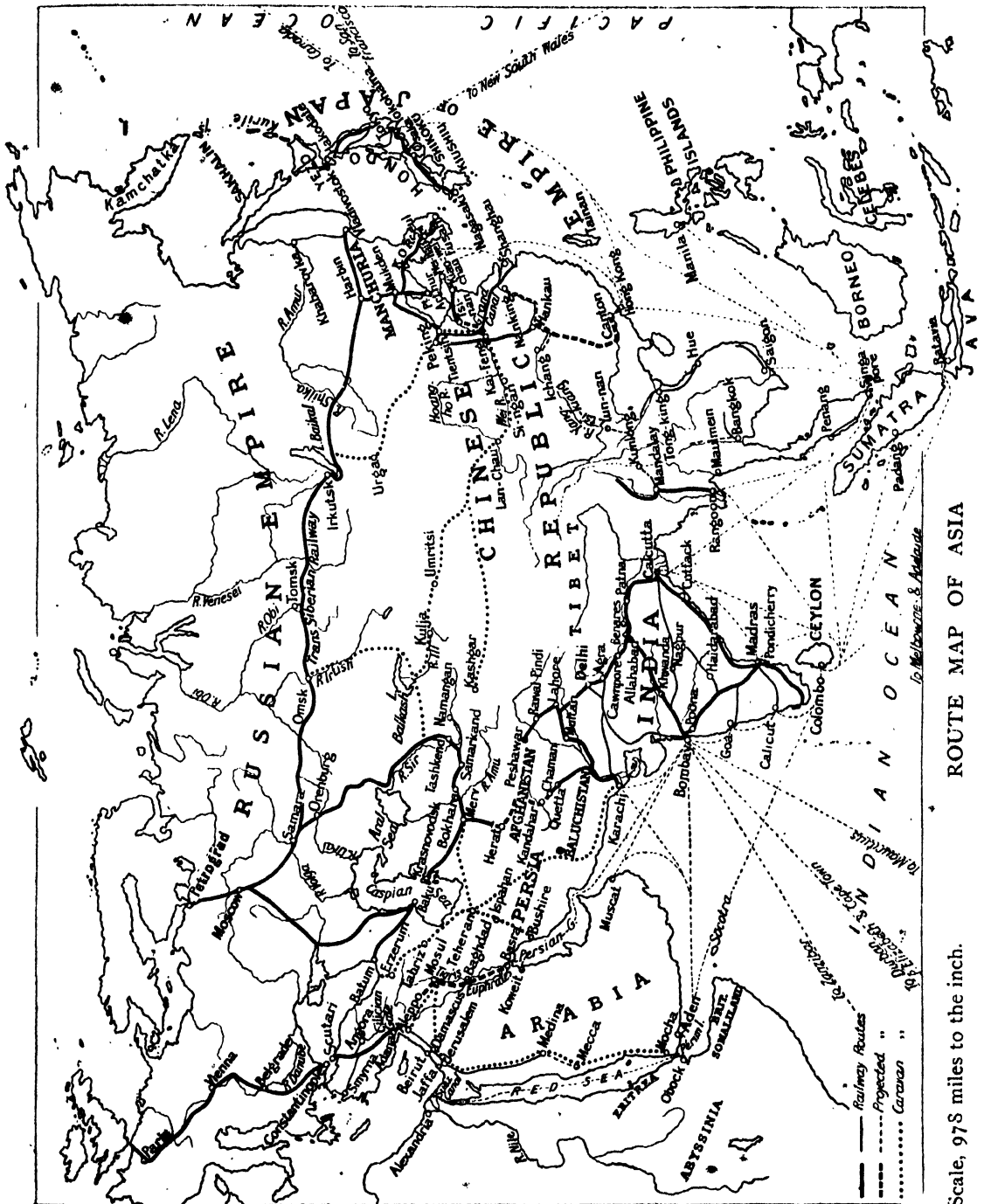
From *Calcutta* a line follows the Ganges Basin *viâ Patna, Benares, Allahabad, Cawnpore, Agra, and Delhi* to *Lahore* in the Indus Basin, and to *Peshawar* on the north-west frontier of India. From *Karachi*, at the mouth of the Indus, a line follows the river to *Peshawar*, and a branch from this is continued through British Baluchistan to *Quetta*. Notice here the dotted line *viâ* *Kandahar* to *Herat*, which, if joined by a railway, would connect the Russian and Indian railways.

From *Bombay* a route crosses the Western Ghats into the Narbada Valley, and from thence into the Valley of the Ganges, joining the previous route at *Allahabad*, and so to *Calcutta*. The more southerly line from *Bombay* to *Calcutta* is cut through forested jungle, and is little used. *Bombay* is connected with *Madras*, and a line following the eastern coastal plain joins *Calcutta* to *Madras* and *Pondicherry*.

Routes in Further India are carried up the Irawadi River Valley, but routes across the mountains to China, although projected, are difficult to construct, and the only line at present open is from *Tong-king* to the Yun-nan Plateau.

Railways of China.

Russia, Belgium, and Japan are all interested in the construction of Chinese railways. The line from *Mukden* is continued to



ROUTE MAP OF ASIA

Scale, 975 miles to the inch.

Peking, and from thence follows the lowland which joins the Hoang-ho and Yang-tsi-kiang to *Hankau*, on the latter river.

A line rapidly nearing completion will join *Hankau* to *Canton*. From *Kaifong*, where this line from *Peking* crosses the Hoang-ho, a branch railway is being carried to the Shantung Peninsula.

Another line from *Shanghai* to *Tientsin* is being constructed by the Germans and British, and this will follow the course now taken by the Grand Canal, which joins these two towns.

A line is projected, following the gorge of the Yang-tsi-kiang, to tap the products of the Red River Valley.

Japanese Railways.

The large island of *Hondo* is traversed by a line of railway, following the coastal plain on the east, through *Osaka*, *Yokohama*, and *Tokio*, with branches, where possible, to the mountainous west coast.

A line running through the island of *Kiushiu*, in the south, runs from the port of *Nagasaki*, and is connected by steamer to the previous line.

Railways are being constructed in the island of *Yezo*, while a line runs from north to south along the gradual western slope of the island of *Formosa*.

Caravan Routes.

From China many caravan routes lead into the interior. The most important is that which follows the Hoang-ho to *S'ngan*, and then follows the Wei tributary to a line of oases at the foot of the mountains leading to *Kashgar* and *Yarkand* in the Tarim Basin. From the Pamir Plateau routes are possible: (1) northward following the river valleys to the Sea of Aral; (2) southward through difficult gorges to the Indus Valley, and so to India; (3) eastward across Persia by a line of oases to Arabia (this latter is followed by Mohammedan pilgrims). Routes from China also lead into Siberia. In Southern China there are caravan routes across Tibet to the Brahmaputra Valley and the native states of *Nepal* and *Bhutan*, or the Indian frontier. Caravans also cross the ridges of Further India, where railways are almost impossible owing to the nature of the country. Arab camel routes are more plentiful in the west. From *Adana* to *Aleppo* in the Syrian Gate,

routes connecting oases go *via Damascus* to the western strip of Arabian coast along the Red Sea. Others lead from Asia Minor to Persia.

EXERCISES.

1. Show what natural features the proposed rail from Scutari to the Persian Gulf will make use of.
2. Show how the convergence of natural features at the Pamir Plateau has caused a similar convergence of railway and caravan routes. What separates the Asiatic Russian Empire from British India, and what purpose would be served if the railways of these countries could be linked together?
3. Why are the waterways of Russian Siberia of little use for commerce?
4. State the exact position of *Aden*, *Singapore*, and *Colombo*, and name the steamship routes which converge on each.

Steamship Routes and Seaports.

The Indian Ocean, bordering the southern shores of Asia is now an important highway of commerce, and the increasing importance of *Aden* in the west, *Colombo* in the centre, and *Singapore* in the east, is due to—

1. The cutting of the Suez Canal.
2. The development of China and Japan during the last century.
3. The increasing trade with India and Australia.

Our trade relations with India are carried on entirely by sea, and *Bombay*, *Calcutta*, *Madras*, and *Karachi* are the chief ports.

The opening up of trade with China has made the ports of *Hong-Kong* and *Wei-hai-wei* (British), *Kiao-chau* and *Port Arthur* (Japanese), and *Tientsin*, *Shanghai*, *Hankau*, and *Canton* (Chinese) important, while *Vladivostok*, north of Manchuria, is the Pacific terminus of the Siberian railway. Japan does a large trade, not only with China, but with European countries, and, across the Pacific, with the United States of America. Her chief ports are *Yokohama*, *Kobe*, and *Nagasaki*.

Aden, on the south-west corner of Arabia, forms the gateway between the Red Sea and Indian Ocean. It occupies a barren volcanic peninsula, joined to the main-

land by a sandy isthmus. It is a strong British fortress guarding the route to India, and an important coaling station. *Perim*, on a small island in the Gulf of Aden, is also a British possession.

Singapore is a small island south of the Malay Peninsula and guarding the Malacca Straits. Affording a good anchorage for ships, and situated at the converging point of about fifty lines of steamers from west, east, north, and south, it is a great centre for trade in addition to its value as a British fortress.

Coleombo—The shallow Palk Strait separating Ceylon from India will not allow of the passage of ocean liners, and hence this port, situated on the south-west of the island, is at the meeting-place of routes from China, India, and Australia. The artificial harbour is valuable both for commercial and naval purposes.

Calcutta, situated on the mouth of the Ganges, is the outlet of the rich products of that basin, and until 1912 was the capital of India.

Bombay, built on an island adjoining the west coast of India, is increasing in importance, and exports much of the cotton of the Deccan and the products of Western India.

Madras, having a poor harbour, is of less trade importance than either Calcutta or Bombay.

Hong-Kong is an island in the Canton river mouth, but the British possession includes a part of the coast of the mainland. It is a strong fortress and of great commercial importance, distributing large quantities of European goods, especially cotton, and exporting tea and silk from China.

Yokohama does more than half the external trade of Japan, sending ocean steamers across the Pacific to the United States.

Nagasaki, in the south of Japan, has a large trade with Fusan the Korean port, with Port Arthur for Manchuria, and with the ports of China.

Smyrna possesses the best harbour in Asia Minor, and is the chief port of that part.

Jedda, on the Red Sea coast of Arabia, has become important owing to the proximity of Mecca and Medina.

Muscat stands on a good harbour near the entrance to the Persian Gulf. It is the chief port of eastern Arabia.

Bushire is the chief seaport of Persia and stands on the eastern side of the Persian Gulf.

Karachi is a railway port near the Indus

mouth. Its chief export is the wheat of the Indo-Gangetic plain.

Rangoon and *Moulmein*, at the mouths of the Irawadi and Salwin respectively, export the produce of Burma, principally rice and teak.

Bangkok is the only port of Siam, and exports rice, teak and rattans.

Canton is a very important port at the mouth of the Canton or Si-kiang River. It has a large export of silk and tea.

Shanghai is the chief Chinese port, and is situated at the mouth of the Yang-tsi-kiang. It has a large trade in silk, tea and cotton.

Tientsin is the port of Peking and a very busy trade centre, due to its important railway connections.

Commerce.

In the preceding parts of this Chapter we have seen how the surface has determined the routes and the position of the great seaports. It has also been shown how surface and other natural causes have influenced the climate and products. It should now be possible to deduce the exports of each part and the materials that will be required in exchange for them.

It has been shown that the great central mountain mass of Asia with its intervening plateaux are inaccessible from the sea, and consist of barren lands supporting a thin population. This population possesses little or nothing to export, and can have no commercial intercourse with the remainder of the world. The same will also be true of the wandering shepherds of the Steppes and the hunting peoples of the barren Tundra, the latter being only able to eke out a bare existence. On the other hand, the rich marginal lands bordering the Pacific and Indian Oceans and the Mediterranean support an agricultural population who chiefly exchange their raw products and food stuffs for the manufactured articles of Western Europe.

Russia.

In Chapter IV. it was shown that the European shores of Russia were on enclosed seas, and therefore she had not the opportunities for importing goods that other nations had. It is important, therefore, that Russia should be self-supporting, and with that object large

portions of the steppe have been irrigated and now form rich agricultural lands. It has also been shown how, with this object, railways have been constructed to Turan or Russian Turkestan and across Siberia, and these carry towards European Russia not only the rich *furs, timber, precious minerals, wheat, and raw cotton*, but some of the products of Manchuria and China. In exchange for these Russia in Europe returns *manufactured goods, especially textiles*.

The northern part of Siberia is tundra, and is therefore of very little commercial value. The central part, consisting of a tremendous area of coniferous forest, is at present the source of a large part of the furs of commerce, and will ultimately be of great importance for its timber. The mineral resources are very great, and the *gold* export is very large.

Turkey in Asia.

The resources of Turkey in Asia, especially Mesopotamia (the basins of the Euphrates and Tigris), for producing large quantities of food stuff and raw material for the manufacturing peoples of Asia have not been developed owing to the bad government of the Turks.

Asiatic Turkey is, however, increasing in commercial importance with the development of its railways. Smyrna, the chief port, has good rail communication inland, and is the chief outlet for the products of Asia Minor (Anatolia). Beirut and Jaffa are connected by rail with Damascus and Jerusalem respectively, and export *wool and wheat*.

In Mesopotamia caravan transport is still used, and Bagdad is the great caravan route centre.

Asia Minor exports *raisins, cotton, opium, figs, barley, liquorice, carpets, wool, and sponges*. Syria exports *silk, tobacco, and oranges*. Mesopotamia exports *cereals, dates, wool, and hides*. Arabia, being mostly desert, has few exports, but *coffee and dates* are important. *Arabian coffee* (Mocha) is exported from Aden. In exchange for these products Turkey in Asia imports *machinery, iron, coal, textile goods, petroleum, and sugar*.

Persia.

Persia is a rich country, but lack of good facilities for transport diminishes its

commercial importance. The chief commercial centres are Tabriz, Teheran, Ispahan, Bushire and Bender Abbas.

Chief Exports.

Cotton (raw)	£1,800,000
Carpets	1,100,000
Fruits	1,000,000
Rice	700,000
Opium	600,000

Chief Imports.

Cotton goods	£3,500,000
Sugar	3,500,000
Tea	750,000
	500,000

The trade of Persia is mainly with *Russia* and different parts of the *British Empire*.

India.

Before the British occupation of India that country did a large trade in the export of art fabrics and hand-made articles, but with the development of her seaports and the construction of new irrigation works the trade has grown rapidly. The irrigation system of India is the largest in the world, and has greatly increased the export of agricultural products. Agriculture is the staple industry of the country, and *rice, tea, wheat, cotton, linseed, rape and mustard seeds, jute, and sugar cane* are the chief crops produced. Bengal, Madras, Bombay, and the Punjab are the chief provinces in which agriculture is carried on. Railway construction has helped to make India one of the great wheat producing countries of the world. Large areas of forest land exist in Burma, the Central Provinces, and Madras. *Teak and sandal wood* are the chief forest products. The mineral wealth of the country is very varied and fairly extensive, and includes *coal, gold, petroleum, manganese, salt, mica, lead, graphite, and precious stones*. Pasture land is fairly abundant on the slopes of the hills and mountains. Sheep and goats are reared, and *Kashmir wool* from the *Kashmir goat* is a noted product. The chief articles of export are *grain* (including rice from Burma and wheat from the Indus Basin), *raw cotton and oil seeds, jute, tea, opium, hides and skins*. The imports consist of *manufactured textile goods, iron goods and machinery, mineral oils, and coal*. Owing to the growth of cotton and jute manufactures in India there has been an increased export of coarse textile goods, resulting in a decreased export of raw material and a decreased import of *British textile goods*.

Chief Exports.

Rice	£22,000,000
Cotton (raw)	19,000,000
Jute (raw)	18,000,000
Oil seeds	15,000,000
Wheat	12,000,000
Hides	11,000,000
Tea	9,000,000
Opium	7,500,000

Chief Imports.

Cotton goods	£40,000,000
Metals and hardware	12,000,000
Sugar	9,000,000
Machinery	3,500,000
Oils	2,300,000
Woollen goods	2,000,000
Liquors	1,700,000

The chief exports to the United Kingdom are cotton, wheat, jute, seeds, tea, rice and indigo.

The trade of India is mainly with *Great Britain*.

Ceylon.

Ceylon is a very prosperous colony with a large production of important commodities. *Tea, coffee, spices, cinnamon, and cinchona* are produced, and *rice fields* and *cocoanut plantations* are abundant. *Precious stones* are an important resource of the colony, and *graphite* is the chief mineral product. Colombo is the only port of commercial importance.

Chief Exports.

Tea	£5,600,000
Rubber	3,800,000
Copra, coir & cocoanut oil	1,600,000
Graphite	600,000
Cinnamon	190,000

Chief Imports.

Rice	£3,000,000
Coal	1,000,000
Cotton goods	1,000,000
Manures	500,000

South-East Asia and the Straits Settlements.

The deltas and lower courses of the rivers contain an agricultural population producing quantities of *rice, sago, spices, pepper, nutmegs, opium, and coffee*. The forested gorges yield valuable supplies of *teak, iron-wood, and lacquer*, and *rubber*, both wild and cultivated, is an increasing article of export. In addition, the rich mineral deposits cause an export of *tin* and *petroleum*. These are exchanged for manufactured articles, chiefly textiles.

Singapore is the great emporium for this part of Asia, and is situated at the meeting point of the various routes.

*Straits Settlements.**Chief Exports.*

Tin	£12,500,000
Gums	3,700,000
Spices	2,000,000
Copra	1,700,000

Chief Imports.

Rice	£7,000,000
Cotton goods	2,300,000
Fish	1,400,000
Sugar	1,400,000

*Siam.**Chief Exports.*

Rice	£5,000,000
Teak	500,000

Chief Imports.

Cotton goods	£1,100,000
Provisions	600,000

The French possessions in South-East Asia export *rice, pepper, cotton, and sugar*, and import *cotton goods, petroleum, and tobacco*.

China.

The chief occupation of the Chinese is at present agriculture, and the exports are *tea, raw silk and silk fabrics, raw cotton, beans, matting, skins, and hides*. In exchange for these are imported *manufactured cotton goods, opium, rice and manufactured articles, including machinery*. Foreigners are only allowed to trade through treaty ports, which now number thirty-four. The chief are Shanghai, Tientsin, Hankau, Canton, Niu chang, Swatau, Chifu, Chung-king, Amoy, and Fuchau. Shanghai is by far the most important of these ports. The opening of these ports has caused a remarkable growth in China's trade, in which most of the European nations are anxious to take a share. In addition to this trade by sea there is a trade with the interior by caravans of human porters to Tibet and Central Asia, and also inland by rail with Russia. The future development of China's mineral resources may cause a rapid growth of her manufactures, and instead of supplying Europe with raw products she may in the future compete with the manufacturing peoples of that continent.

Chief Exports.

Silk (raw & fabrics)	£14,300,000
Beans & bean-cake	6,300,000
Tea	5,200,000
Cotton	2,600,000
Oils (vegetable)	2,200,000
Sesamum seed	1,800,000

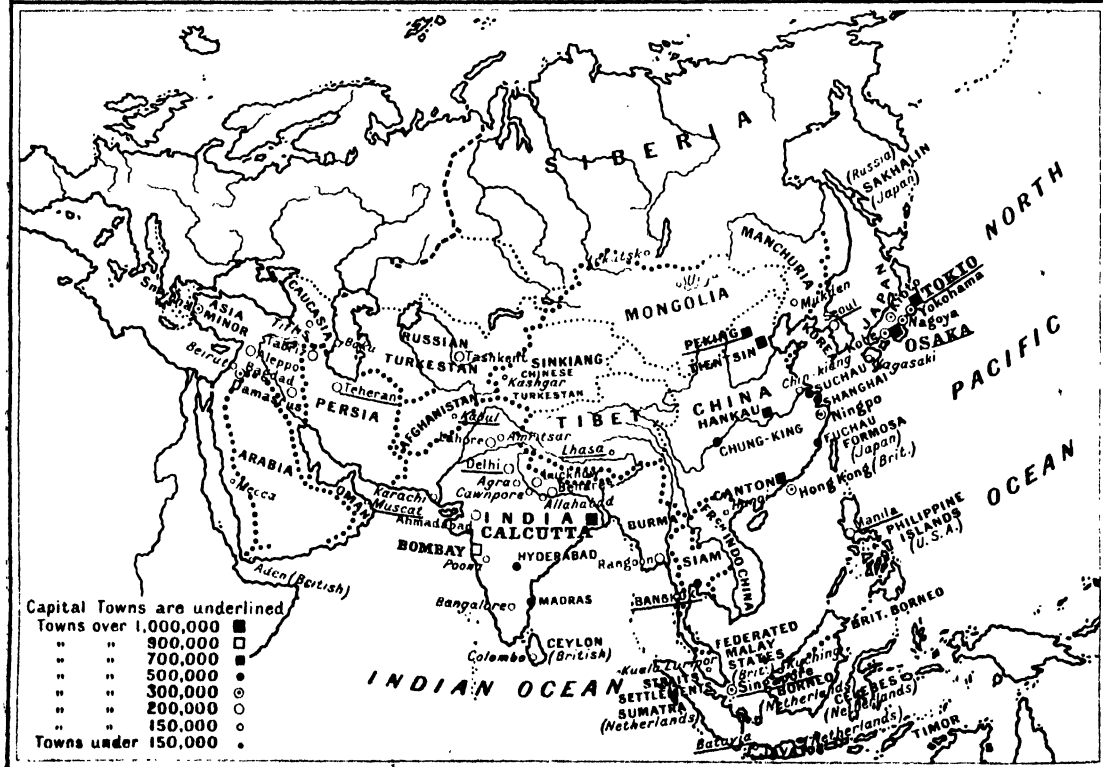
Chief Imports.

Cotton goods	£22,000,000
Opium	7,300,000
Metals	2,800,000
Rice	1,800,000
Fish	1,700,000
Cigarettes	1,300,000

The trade of China is largely with *Hong-Kong, Great Britain, Japan, the United States, and Russia*.

Japan.

The rapid development of the manufactures of this country, in addition to her agricultural occupation, has caused a rapid expansion in her commerce similar to



ASIA—POLITICAL DIVISIONS.

that of China. *Silk goods* and *tea* are the two most important articles of export, but *cotton goods*, *rice*, *coal*, *matting*, *matches*, *copper*, *porcelain*, and *lacquer ware* are also exported in large quantities. The imports are *rice*, *cotton*, *sugar*, *locomotives*, *machinery*, and *woollen goods*. A large number of new ports were opened to foreign commerce in 1899. Yokohama is the most important port of the country.

Chief Exports.

Silk (raw)	£19,000,000
Cotton yarn	7,100,000
Silk goods	3,500,000
Cotton shirtings	3,400,000
Copper	2,800,000
Coal	2,300,000
Straw plait	1,600,000
Sugar	1,600,000
Matches	1,200,000
Tea	1,100,000

Chief Imports.

Cotton (raw)	£23,000,000
Rice	4,800,000
Oil cake	3,900,000
Sugar	3,600,000
Machinery	3,400,000
Woollen goods	3,000,000
Petroleum	1,100,000

The chief exports to the United Kingdom are straw plait, rice, drugs and curios.

The trade of Japan is mainly with *India*, *Great Britain*, the *United States*, and *China*.

The East Indies.

The rich, fertile islands of the East Indies export *hemp*, *sugar*, *coffee*, *tobacco*, *cigars*, *spices*, in addition to *camphor*, *rubber*, and *gutta-percha*, obtained from the forests. The chief imports are *cotton goods*, *machinery*, *wheat*, and *rice*.

Dutch East Indies.

Exports: *Sugar*, *coffee*, *tea*, *rice*, *indigo*, *cinchona*, *tobacco*, *copra* and *tin*.

The bulk of the exports go to the Netherlands.

*Philippine Islands.**Chief Exports.*

Hemp	£4,500,000
Copra	2,300,000
Sugar	2,000,000
Cigars	700,000
Tobacco leaf	400,000

Chief Imports.

Cotton goods	£2,300,000
Rice	1,600,000
Iron goods	1,400,000
Meat & dairy products	600,000

EXERCISES.

- Plot a curve to show the value of the wheat import of Britain from India—

1908	£1,300,000
1909	6,900,000
1910	7,400,000
1911	7,800,000
1912	10,000,000
1913	11,000,000

- Make a similar curve for tea—

1908	£5,700,000
1909	6,300,000
1910	6,200,000
1911	7,000,000
1912	7,100,000
1913	7,300,000

- Write an account of the commercial importance of the monsoon lands of Asia.
- From which parts of Asia are the following exported—jute, hemp, rice, indigo, spices, copra, and coffee?
- Say what you can of the importance of the coco-nut products.
- Give an account of the products of the East Indies.
- What are copra, cinnamon, and linseed? In which part of Asia are they obtained, and what is the commercial value of each?
- Name the rich areas of Asia, and name the chief exporting parts.
- What are the forest products exported from Asia, and from which parts are they obtained?

Population and Peoples.

A comparison of the Population Map with the Surface, Climate, and Productions will show how natural conditions have determined the distribution of the peoples of Asia. The map shows a striking contrast between the thinly peopled lands of Northern and Central Asia and the marginal lands bordering the Pacific and Indian Oceans. Surface features also appear to have separated the White races from the Yellow races. A line drawn from the Hindu Kush, continued through the Pamirs and the lofty Himalayas to South-East Asia, separates the White races living to the south-west of it from the Yellow races occupying the greater part of the continent.

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER VI.

AFRICA.

CONTENTS.

World Position and Size—Seas, Coasts, Islands.
Surface.
Climate.
Vegetation and Animals—Cultivated Products.
Minerals—Industries and Occupations.
Routes.
Commerce and Ports.
Peoples—Distribution of Population.

MAPS.

48-51. Climatic Maps.
52, 53. Vegetation.
54. Minerals and Manufactures.
55. Routes.
56. Population and Political.

World Position and Size.

Africa is a vast peninsula joined to Asia by the narrow Isthmus of Suez, 27 miles long.

It stretches from 37° N. to 34° S. latitude, and has an area of 11,500,000 square miles.

The cutting of the Suez Canal transformed Africa into an island, and saved 2500



Fig. 19. North Africa, showing Connection with Europe.

miles' journey for ships on the route to India and the Far East.

Connection with Europe.

Fig. 19 shows that the *Sierra Nevada Range* in the south of Spain is continued on the opposite side of the Strait of Gibraltar by the *Pyrenean Mountains*.

Seas, Coasts, Islands.

Africa is a huge, compact mass with no large openings or seas penetrating into the land. Fig. 20 shows a large area which is more than 400 miles from the sea. Look carefully at the map and notice that there are no indentations or harbours, and that this regular coast is bordered by a narrow plain, rising to great block-tablelands on the one side and descending to deep seas on the other.

On the north the *Gulfs of Sidra and Gabes* are shallow openings of no commercial value, while the *Bights of Benin and Biafra*, forming part of the *Gulf of Guinea*, are useless as harbours. In the south *Delagoa* and *Algoa Bays* are of greater value.

The *Red Sea* is a long, narrow sea between the steep edges of the plateaux of Arabia and North Africa. In the south it narrows to form the *Strait of Bab-el-Mandeb* (or Gate of Tears), and this constitutes a gateway guarded by the British coaling station of Aden.

Although Africa is washed on all sides by oceans, yet these exert little beneficial effect on either climate or commerce, because—

(1) A great part lies within equatorial regions, and here the

narrow coastal plain is a thickly forested, fever-stricken jungle, forming an obstacle to routes into the interior.

- (2) It is composed of high tablelands, which form an obstacle to trade and prevent the influence of the sea reaching the interior.
- (3) In the north-west the coast borders desert for a considerable distance.
- (4) Communication is most difficult in Morocco and the far south

its natural obstacles, and trade routes are being carried into the country.

EXERCISES.

1. What routes would—(1) A sailing vessel, (2) a steamboat, take in travelling from England to India? What is the importance of the Suez Canal in the latter route?
2. Africa is almost surrounded by water, and yet the sea has little influence on the climate or commerce of the continent. State why.
3. Africa, although known to the earliest civilisation, remained undeveloped and unexplored till the last two centuries. Give reasons, and state why settlements existed on the Mediterranean and on the south coast long before the remainder was explored.

Surface.

Compare the surface of Africa with that of Europe and Asia, and notice that it has no axis of folded mountains similar to the other continents, but consists of a mass of tablelands higher in the south and east and lower in the north and west. These allow of no well-defined water-parting, and hence the rivers flow in all directions, while their lower courses are impeded by waterfalls, where they descend from the plateau to the coastal plain.

Africa can be divided into the following natural regions for purposes of description.

1. *The Atlas Region* in the north west, which is a continuation of the mountain structure of Europe.
2. *The Sahara*, the largest desert area in the world, and a continuation of the Asiatic deserts.
3. *The Niger Basin and the Coastal Plain of the Guinea Coast.*
4. *The Plateau of the Great Lakes.*
5. *The Nile Region and Abyssinia.*
6. *The Congo Basin.*
7. *The Zambesi Basin.*
8. *South Africa.*

The Atlas Region.

This region consists of a high mountain mass in the north-west, dividing into three parallel ranges farther east, known as the *Great Atlas*, the *Anti-Atlas*, and the *Little Atlas*. The whole system, stretch-

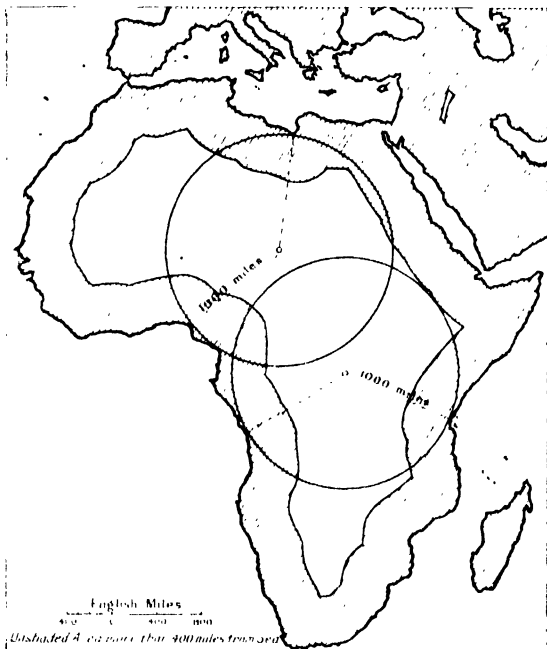


Fig. 20.

(Cape of Good Hope Province), where climatic conditions are the most favourable.

- (5) Where Africa most nearly approaches Asia the steep edges of the desert on either side form an obstacle to trade.

Hence, although Africa was known to the earliest civilisations of the world, yet its interior was unknown till the nineteenth century, when explorers such as Mungo Park, Baker, Livingstone, and Stanley made their journeys into the interior. Modern inventions are now overcoming

ing from Cape Ghir to Cape Bon, is 500 miles in length and 200 in breadth. The valleys of the Great Atlas, and the fertile area between it and the *Little Atlas* range, form a fertile region known as the *Tell*. The rivers which rise in the Great Atlas break through the coast range. During the winter floods they carry down quantities of mud, but in the hot summer they nearly dry up.

The Sahara.

The Sahara forms the western part of a great belt of deserts stretching from the Pacific to the Atlantic. This great waste, almost as large as Europe, forms a barrier between the surface features, climate, products, and peoples of the Mediterranean shores and those of Africa proper, and takes three months to cross by camel caravan from north to south. Large areas are covered with sand dunes.

The *Nile Region* is a narrow fertile strip crossing the desert from north to south, and forms a link between tropical Africa and the Mediterranean.

The sand of the desert is caused by the continual expansion and contraction to which the rocks are subjected by extremes of temperature between day and night. This sand, blown by the wind, forms monotonous lines of crest and trough known as sand dunes. In parts of the desert there are depressions in the surface, and water supplies in these cause patches of fertility. These are known as oases, and are the stopping places for camel caravans, and make routes possible across the desert.

The Niger Basin and the Guinea Coast.

The plateau south of the Sahara rises to a steep edge forming the *Futa Jallon Highlands*, and from this brink descends abruptly to the Coastal Plain. This causes two systems of rivers: (1) short rapid rivers, obstructed by rapids, draining to the Guinea Coast; or (2) continental rivers, which drain the interior gradual slope. The chief continental rivers are the *Senegal*, the *Niger*, and the streams flowing to the inland drainage system of *Lake Tchad*.

The *Niger*, 2600 miles long, drains an area of 900,000 square miles. In its upper course it is fed by many streams, but during its middle course near the desert margin it receives no tributaries. Farther down, the *Sokoto* and the *Benue*

join it from the east. This latter stream forms a navigable waterway for hundreds of miles. South of the Benue confluence the river is navigable to its delta.

The Plateau of the Great Lakes.

Bordering the east coast is a narrow unhealthy plain, and from this the plateau rises to a steep eastern edge, 8000 feet high, by a series of terraces, and slopes gradually westward. This plateau is crossed by

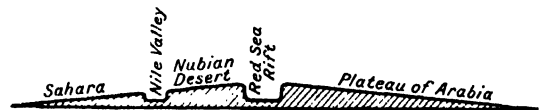
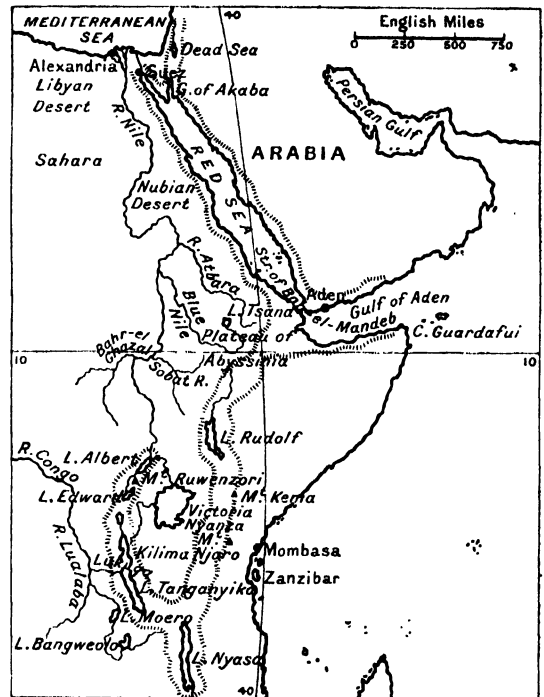


Fig. 21.—East Africa, showing Rift Formation.

two rifts. In these rifts are long narrow lakes feeding three great river systems: *Lake Albert* and *Lake Edward* drain northward to the *Nile*, *Tanganyika* is drained by the *Lukuga* to the *Congo*, and *Nyasa* is drained by the *Shire River* to the *Zambesi*.

The Nile Region and Abyssinia.

The *Abyssinian Plateau*, which is steepest along its eastern edge, rises from a narrow coastal plain bordering the Red Sea, and slopes gradually westward.

Rising in the plateau, and flowing through deep gorges to join the *Nile*, are the *Sobat*, the *Blue Nile*, and the *Athara*. The *Nile*, flowing from the lakes of the Eastern Plateau, flows northward along the western foot of the plateau, and then crosses the desert to form a delta on the shores of the Mediterranean.

Lake Edward and Lake Albert lying in the western rift and Victoria Nyanza on the plateau form great reservoirs, which enable the *Nile* to keep up its steady flow throughout the year. In its upper course the river descends by rapids from the plateau to the lower fertile plains of Eastern Sudan at Lado. In its middle course the river is choked by floating masses of vegetation forming islands. The *Sobat*, the *Blue Nile* (at Khartum), and the *Athara* (at Berber) from the Abyssinian Plateau, and the *Bahr-el-Arab* from the west, join the main stream in its middle course. Beyond Berber the river makes a great S-shaped bend, and flows for 1800 miles across the desert, causing a fertile strip on either side of the river. In this part of its course it descends by six cataracts to the plain at its mouth, where it forms a delta on the Mediter-

The Congo Basin.

The greater part of the basin of the Congo consists of low land surrounded on all sides by high plateaux. The high land on the south forms the water-parting between this river and the *Zambesi*, and that on the east forms the brink edge of the western rift. This hollow was once the bed of an inland sea to which all the tributaries flowed, but a break in the western coast rim drained it to the Atlantic.

The *Congo* rises in the highlands between *Lakes Tanganyika* and *Nyasa*, and draining *Lakes Bangweolo* and *Moero* turns north and flows parallel to the western rift, receiving the *Lukuga*, which carries the waters of *Tanganyika* to the Congo. The main stream drops into the depression at *Stanley Falls*, and is now navigable for 1000 miles to *Stanley Pool*. Below this it enters a narrow gorge, and breaks through the western edge of the plateau at the *Livingstone Falls*, after which it has a navigable estuary of 100 miles. In its middle course it receives the *Ubangi* and the *Aruwimi* from the north, and the *Kasai*

and numerous other streams from the south. The Congo Basin lies in an area of equatorial rains, so that the tributaries and the main stream carry an immense volume of water to the sea.

Points of Resemblance between the Rivers Nile and Congo:—

- (1) Both rise on the eastern plateau.
- (2) Both have an upper plateau course separated by rapids from a middle navigable course.
- (3) Both have a shorter navigable course at their mouths.

The Zambesi Region.

The *Zambesi* Region extends from the Congo-*Zambesi* water-parting in the north to the inland drainage system of Lake Ngami and the Limpopo River in the south. The *Zambesi* is the only large river of Africa which flows eastward. The other eastward-flowing rivers drain the steep edge of the plateau, but this river has the greater part of its course on it.

The *Zambesi* rises near the Kasai tributary of the Congo, and flows due south in its upper course across a low swampy region bordering the *Kalahari Desert*. It then turns east across a plateau of volcanic rock and drops over the *Victoria Falls* (400 feet high) into a narrow gorge. This is the first of a number of rapids which the river makes before it reaches its lower navigable course on the coastal plain. Its delta, consisting of eight mouths, is not useful for navigation, as these mouths are constantly shifting. Only two of them, the *Chinde* and the *Quilmane*, are navigable for even small vessels.

The *Victoria Falls* are higher and have a greater volume of water than the famous Niagara Falls. The force of this waterfall, represented by 35,000,000 horsepower, it is now proposed to use for railways, mines, and electric power generally.

Above the falls the *Zambesi* has a navigable upper course. The last falls in the river are the *Kebra Basa Rapids*, and from *Tete*, situated below these, the river is navigable to its delta.

South Africa.

The steep edge of the plateau is continued here in the *Drakensbergs*, and curves

round in the south to form the *Nieuwveld Mountains*. From the narrow coastal plain the land rises in terraces, known as the *Little* and *Great Karroo*, on to the plateau or *Veldt*. Dotted also over the plateau are isolated flat-topped hills known as *Koppes*. The *Orange* and its tributaries form the chief drainage of South Africa, having a basin of 370,000 square miles, but owing to the volume of water lost by evaporation only a small quantity is carried to the sea. The *Limpopo*, rising near the Vaal, tributary of the Orange, makes a semi-circular sweep and descends from the plateau, which is here much lower, by a series of falls. *Lake Ngami*, in the west, forms a basin of inland drainage.

The Veldt is divided into three belts:—

- (1) The *High Veldt* or plateau proper.
- (2) The *Middle Veldt* or terraced lands of the east.
- (3) The *Lower* or *Bush Veldt* in the lower valleys.

Madagascar.

This island has a similar plateau formation to that of Africa, with a steep slope on the east rising from a narrow coastal plain, and descending on the west to a lower and wider swampy plain.

EXERCISES.

1. Contrast the surfaces of Europe and Africa, and show the result of the structure in the latter on the direction of the rivers, and their value commercially.
2. Describe the Congo. Draw a comparison and contrast between this river and the Nile.
3. Without the Great Lakes there would be no Nile, and without its Abyssinian tributaries there would be no Egypt. Explain this statement.
4. Describe the Niger and its tributaries. Why does the river rise near the coast and flow inland? Which parts of the river are navigable? Compare these with similar navigable sections of the Nile.
5. Describe the Zambesi. How does it differ from the other great rivers of Africa?

Climate.

Compare Maps 48 and 49, which show the January and July Isotherms. Find the Equator and the Tropics of Cancer and

Capricorn, and notice that the greater part of Africa lies within the Torrid Zone, and having vertical or nearly vertical rays from the sun throughout the year will possess a hot climate. The maps show that most of the area within the Torrid Zone has a climate varying only between 70° and 90° F.

During July there is a large area north of the Equator with a temperature over 90° F., and in January there is an area south of the Equator with a similar temperature. This is due to the inclination of the earth's axis, which causes the vertical rays of the sun to be felt north of the Equator in July and south of it in January.

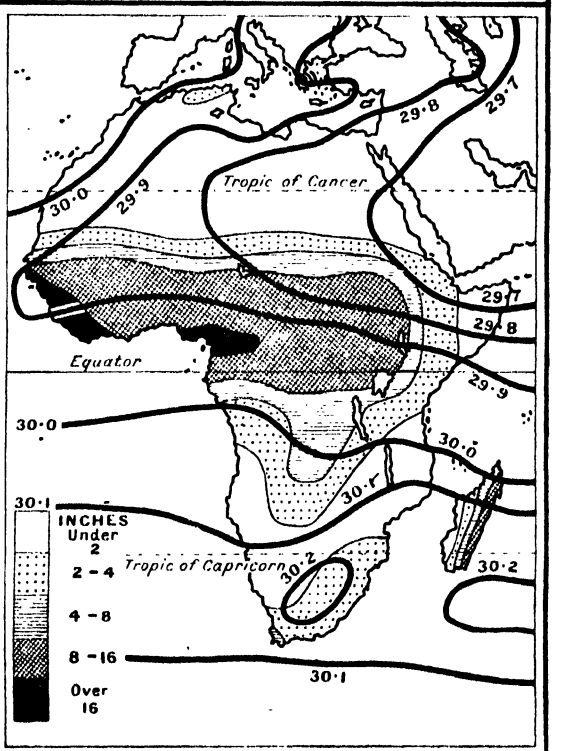
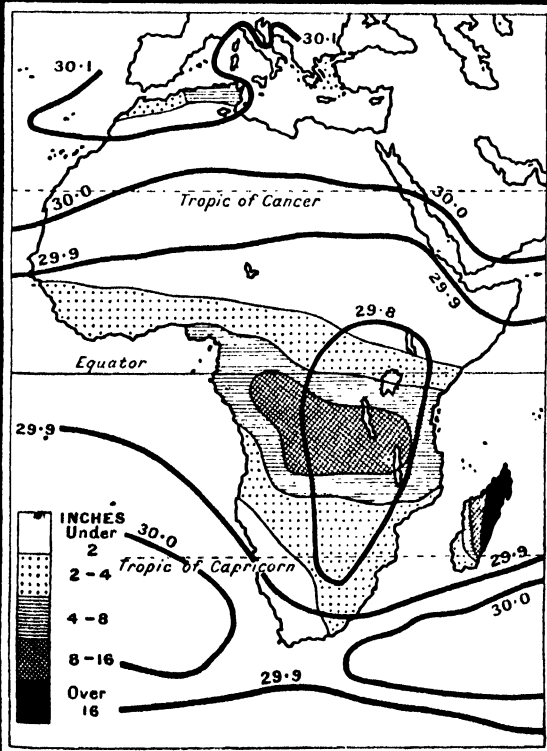
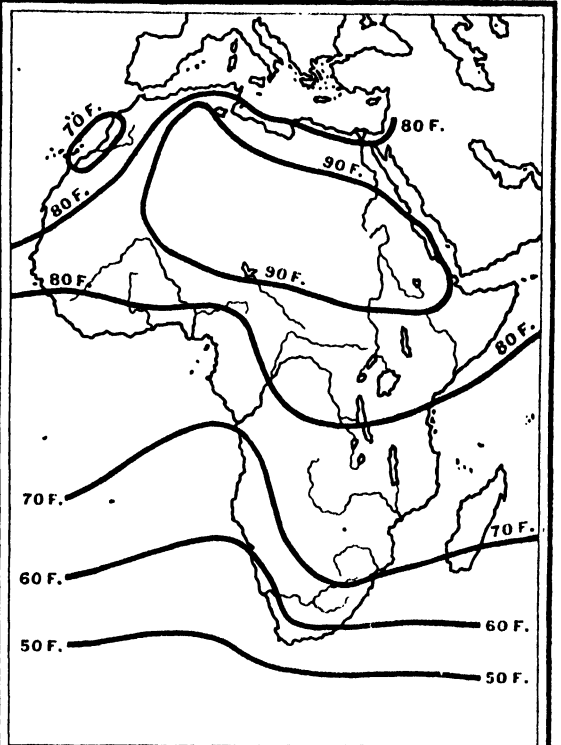
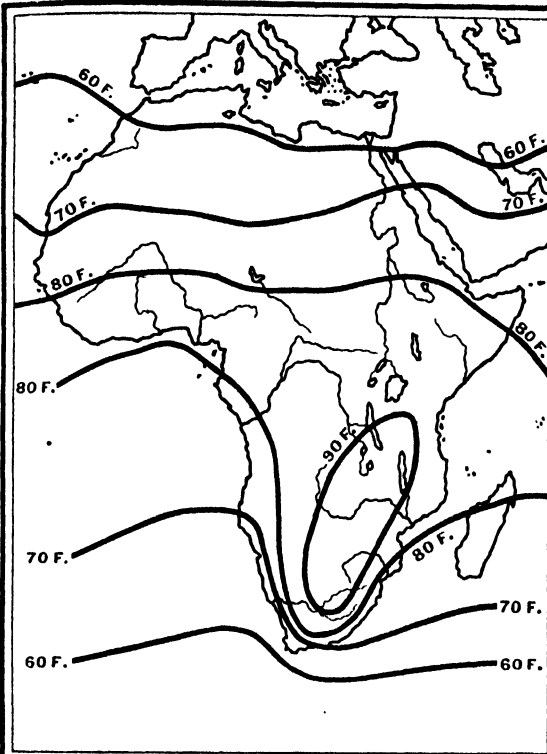
The area north of the Equator having a summer temperature of over 90° F. is much greater than the similar area south of the Equator in January. This is due to the great land mass of Africa north of the Equator being adjacent to the land mass of Asia and feeling no influence of the sea. Africa south of the Equator, is much narrower and the influence of the sea is felt.

Make a comparison also between Maps 50 and 51, which show the seasonal rainfall. Remember that as the Equator cuts Africa into two, the northern part will have its summer while the southern part will have its winter, and *vice versa*. Map 51 therefore shows summer rainfall north of the Equator and winter south of it, and Map 50 shows winter rainfall north of the Equator and summer south of it. From these maps find the following regions.

- (1) *Belt of Constant Equatorial Rains* on either side of the Equator stretching along the Guinea coastal plain in the north to the Congo Basin in the south. In this belt the area of greatest rain falls along the Guinea coast in northern summer and over the Congo Basin in southern summer, but at all times this region has a heavy rainfall.
- (2) *Belt of Summer Rains*.—Notice that from May to October this belt of rain shifts north to include the Niger Basin, and that in the other half of the year it shifts south to include the Zambesi.
- (3) *Desert Belts*.—North of the northern summer rain area there is a region which has less than 5 inches of rain throughout the year, and there is a similar area south of the Equator, along the west coast, having less than 5

JANUARY ISOTHERMS.

JULY ISOTHERMS.



JANUARY RAINFALL.

JULY RAINFALL.

inches in parts and less than 10 inches in others.

- (4) *Belt of Winter Rains.*—In the Atlas Region of the north-west there is a belt having from 10 to 20 inches of rain in northern winter and less than 10 inches in summer. In the far south-west of Africa around Cape Town there is a similar region having the greater part of its rainfall in southern winter.

EXERCISES.

1. Name the parts of Africa which fall within the Belt of Constant Equatorial Rains.
2. Explain why the greatest heat and lowest pressure is north of the Equator in July and south of it in January.
3. Describe the monsoons of Abyssinia. State their cause. What is the effect of these monsoons upon the fertility of Egypt?
4. Describe the climate of the South African Veldt. Give reasons for your answer.
5. Name two desert regions bordering the sea coast. Explain clearly the cause of each.
6. Name these rivers of Africa which overflow in summer. Give reasons in each case.
7. Divide the west coast of Africa into climatic regions. Show clearly how the inclination of the earth's axis and the consequent shifting of the sun's vertical rays north and south of the Equator causes this.
8. Explain why there is a belt of desert stretching across North Africa from east to west, but in similar latitudes south of the Equator the desert is only in the western part of the continent.

Vegetation and Animals.

The area of constant rain is the belt of dense *tropical forests*, while the summer rain belts north and south of it and the monsoon regions of the Eastern Plateau are *savannah lands* consisting of more open forests on the tropical forest edge, merging into park lands and to poor grass lands bordering the desert. The summer rain felt on the veldt in the south causes grass land, which merges to desert in the drier west. The *desert areas* are devoid of vegetation, except coarse grasses and thick-leaved thorny plants capable of withstanding drought. The *winter rain areas* in the far north and south having hot, dry summers are capable of supporting a *subtropical vegetation*.

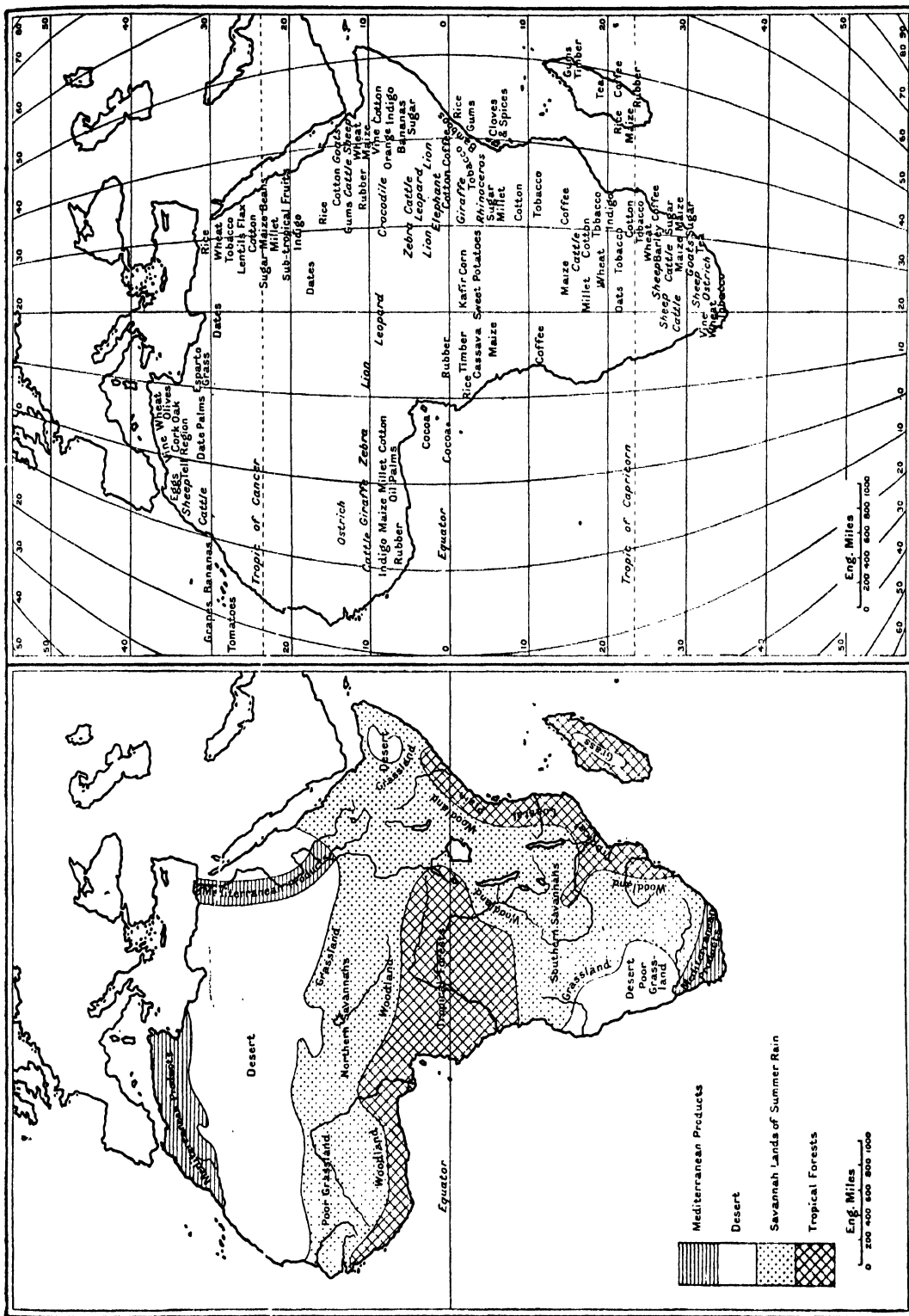
Constant rain and intense heat cause in the *tropical forests* giant trees struggling upward to obtain light and air. The ground is covered with an undergrowth so thick that it is most difficult to penetrate. The dense foliage of the trees causes the forest to be dark, while the thickness of the vegetation has crowded out both man and beast. The only animals in these forests are monkeys, reptiles, and insects. The ease with which food can be obtained, coupled with the effects of the moist heat, causes the inhabitants to be indolent and backward. The moist heat is largely responsible for malarial diseases, and the infection from these is carried by the mosquitoes which are prevalent in these regions. *Rubber* is the commercial product of the forest, but *timber (ebony and mahogany)*, *oil palms*, and *medicinal plants* are valuable products. The unhealthy climate has prevented the collection of wild rubber by the white man. During recent years a species of upland rubber has been planted on the higher plateaux, and being produced in healthier surroundings is capable of being developed under European guidance.

The *Savannah Regions* are the home of many wild animals, of which the chief are the lion, leopard, elephant, giraffe, zebra, rhinoceros, and crocodile. Big game hunting attracts travellers to the Eastern Plateau, while ivory has been an important article of export since the arrival of the slave-dealers on the east coast. Towards the desert border the grass provides food for herds of sheep and cattle, and ostriches feed on the desert edge in the north and on the dry Karroos in the south.

Deserts.—The want of rain is responsible for the lack of vegetation in the *Sahara Region*. Wherever water is found, there the fertile soil produces rice, millet, date-palm, and other cereals and fruit. These fertile spots are known as oases, and they make journeys possible across the desert.

The *Kalahari Desert* differs from the Sahara in having a poor vegetation capable of supporting flocks and herds kept by the native Hottentots and Bushmen. This vegetation is largely due to underground supplies of water.

Mediterranean Regions.—In the Atlas Region of the north-west, and also in the neighbourhood of Cape Town, the warm,



AFRICA—VEGETATION PRODUCTS.

AFRICA—VEGETATION BELTS.

wet winters cause the growth of plants throughout that season, while the dry, hot summers enable subtropical fruits to ripen.

Cultivated Products.

Tropical Forests.

In the clearings quantities of *cassava*, *maize*, *rice*, *sweet potatoes*, and *Kafir corn* are grown. These require little cultivation. On the slopes of the plateaux, especially in Angola, *coffee* is produced. *Cocoa* is an important product of tropical lands, and is grown largely in the islands of Fernando Po, St. Thomas, and Prince's Island.

Western Sudan.

In the summer rain belt *maize* and *millet*, *cotton* and *indigo* are the chief crops. Special attention is being paid in this region to the growth of cotton, and every encouragement is given to extend its cultivation.

Nile Region.

The chief products of Egyptian Sudan are *rubber*, *gums*, and *cotton*, and if these lands were irrigated they would be capable of producing larger supplies of *rice* and *cotton*. In the Lower Nile or Egypt Proper, the Nile floods cause on either side of the river a fertile strip of land, beyond which is desert. Since Egyptian finances have been controlled by Britain, large irrigation works, including dams constructed across the delta and at Assiut and Aswan, have been constructed. This has made both summer and winter crops possible in a region which at one time produced only one crop per year. The chief products cultivated now are *cotton*, *tobacco*, *wheat*, *maize*, *millet*, *rice*, *beans*, *lentils*, *sugarcane*, *flax*, *indigo*, and subtropical fruits, such as *oranges*, *lemons*, *figs*, and *dates*.

Abyssinia.

There are several zones of climate in this region due to elevation. The tropical lands below 5000 feet produce *cotton*, *indigo*, *bananas*, and *sugar*; above 5000 feet subtropical plants such as the *vine*, *orange*, *wheat*, *maize*, while higher still the harder cereals such as *oats* are grown, and much of the land is pasture for *cattle*, *sheep*, and *goats*. The well-

drained slopes produce quantities of *coffee*.

Eastern Plateau.

Under British and German development this region is producing increasing quantities of *cotton*, *tobacco*, *coffee*, *sugar*, and *millet*. The coastal plain produces *rubber* and *gums*. The terraces are dry, grassy plains, but the steep slopes are forested with *bamboos*. Zanzibar and Pemba have a fertile soil, producing *cloves* and *spices*.

Rhodesia.

Under British control this region is now being rapidly developed, being capable by irrigation of producing rich food supplies. Increasing quantities of *maize*, *millet*, *wheat*, *oats*, *cotton*, and *tobacco* are produced, while the grass land provides rich pasture for *cattle*.

The elevation of the plateau of Southern Rhodesia raises it above the limit of malarial fever, and the ideal climate, especially during the dry winter, makes it suitable for Europeans. *Coffee* is a valuable product in Northern Rhodesia and on the slopes bordering Lake Nyasa. The low-lying coastal plain of Portuguese East Africa is unproductive, but the slopes of the plateau are cultivated to produce *coffee*, *tobacco*, *cotton*, and *indigo*.

South Africa.

The coastal plains of Natal and the south produce *maize*, *sugar*, and *tea*. The Veldt or plateau is chiefly pasture land, but with irrigation can grow crops of *wheat*, *barley*, and *maize*. On the lower Bush Veldt *tobacco*, *coffee*, and *sugar* are grown. The Karcos form pasture land supporting *ostriches*, *sheep*, and *goats*. The Mediterranean climate around Cape Town causes the growth of *grapes* (made into wine), *wheat*, and *tobacco*. This area is rich in wild flowers, and *orchids*, *pelargoniums*, and *lilies* are abundant. *Timber* from the forests is plentiful, and *Australian gum trees* have been cultivated with great success.

Atlas Region.

The products in this area are similar to those of Southern Europe. *Wheat*, *barley*, *olives*, the *vine*, and *lemons* are grown in the lower lands. The plateau forms

pasture land supporting *sheep* and *goats*, and producing *esparto* or *alfa grass*, used in the manufacture of paper. *Dates* are grown on the desert edge. The seaward slopes of the mountain are forested with evergreen trees, the chief of which is the *cork oak*. The Tell region is remarkably fertile, and consists of the slopes of the Great Atlas and the valleys between it and the coastal chain. The French have by irrigation increased the products of Algeria and Tunis. Morocco contains many fertile plains which await development.

Madagascar.

This island grows *tea* and *coffee* on its eastern slopes, and *rice* and *maize* on the lowlands. The forests produce *rubber*, *gums*, and *timber*.

Canary Islands and Madeira.

Large quantities of *grapes*, *tomatoes*, and *bananas* are obtained from the Canary Islands, and *grapes* are also obtained from Madeira.

EXERCISES.

1. Draw a map showing the chief vegetation regions of Africa, and explain how far they are dependent on surface and climatic conditions.
2. What are the chief Mediterranean fruits grown in Africa? In what district are they grown, and upon what climatic conditions does their growth depend?
3. The tropical forests merge gradually on either side of the Equator through open woods to poor grass lands. Give the climatic causes of this.
4. What are the chief products obtainable from the tropical forests?
5. Name the chief wild animals of Africa. In what localities are they mostly found? Name the chief area from which ivory is obtained.
6. What are the conditions determining the growth of coffee, rice, cotton, and maize? Name the chief areas where grown in Africa.
7. Explain clearly why there is a fertile strip on either side of the Nile running from south to north across a desert region. What products are grown in this region?
8. European nations are developing Africa with the object of obtaining additional supplies of food and raw materials for

the manufacturing populations of Europe. Name the chief supplies of food and raw material to be obtained from Africa, and the locality where each is grown.

9. State where irrigation works have been constructed in Africa. What is the object of these irrigation works, and what products are grown as a result?

Minerals.

Notice from Map 54 that the southern part of Africa is rich in mineral wealth. This has caused a large influx of mining peoples, and centres have sprung up where before existed only the agricultural lands of the Dutch farmer or the kraals of the native.

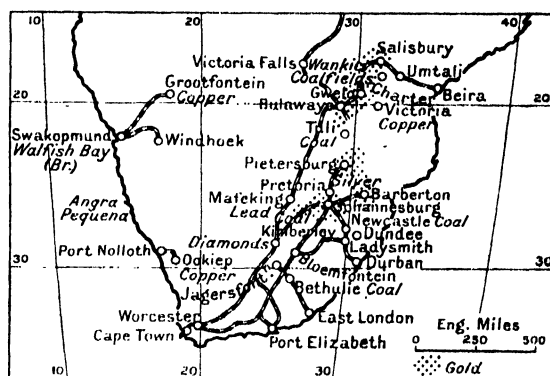


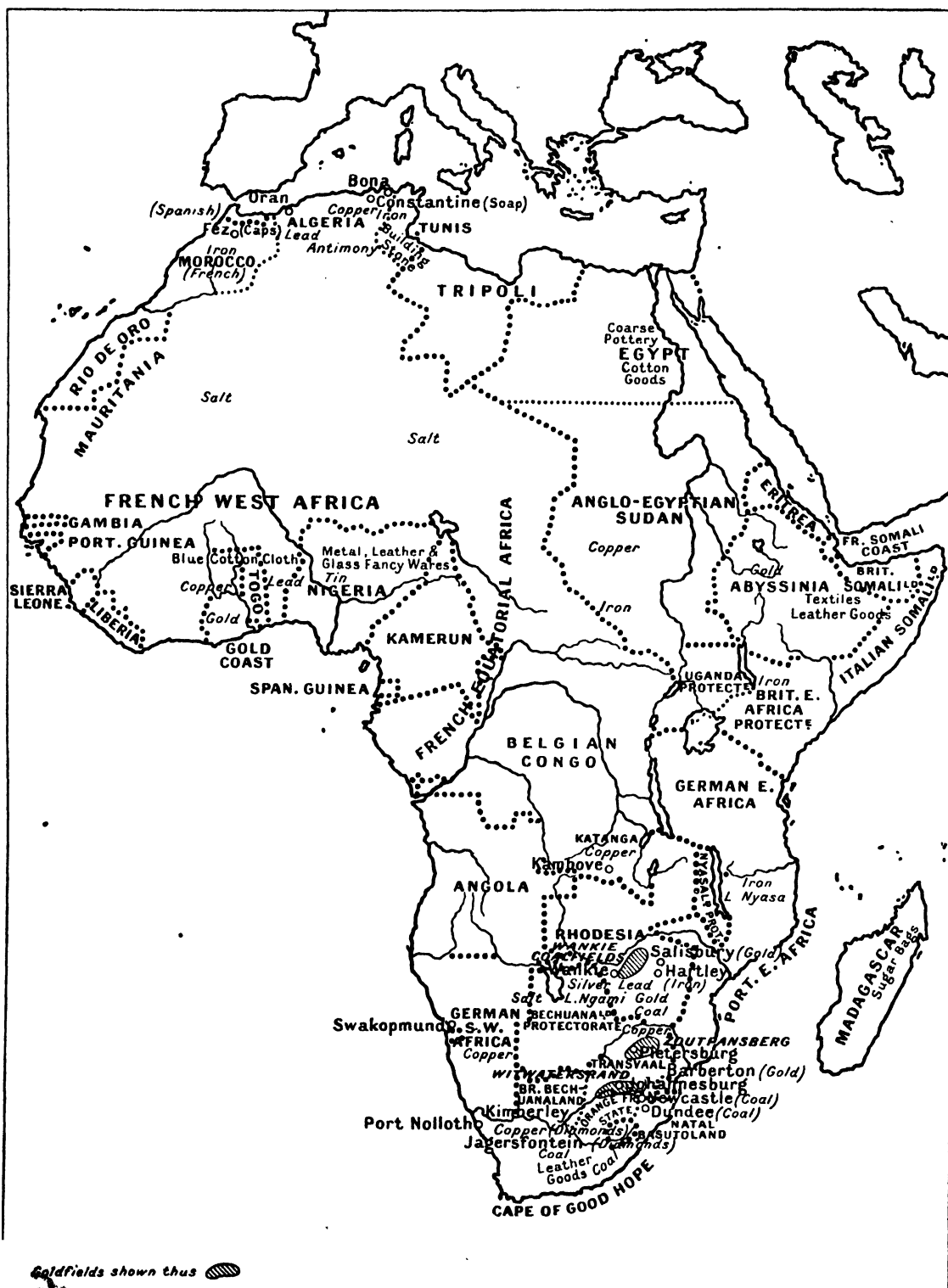
Fig. 22. — South Africa, Minerals and Routes.

Gold is found in quartz veins in the *Transvaal* and in *Rhodesia*. Rich deposits are found along the *Guinea Coast*; so far this gold has been obtained largely from the alluvium brought down by the rivers.

On Map 54 find *Johannesburg*, *Barberton*, *Pietersburg*, and *Zoutpansburg* in the *Transvaal*, and *Salisbury* in *Rhodesia*. Each of these towns is the centre of a gold-mining region. *Johannesburg* is the centre of the *Witswatersrand*, a ridge of gold-bearing quartz 60 miles long and 1000 feet above the surrounding plateau. The gold in these regions occurs in particles evenly distributed through the quartz, and this latter has to be crushed and the gold extracted.

The whole of the *Guinea Coast* is gold-bearing, and the reefs are now being worked by British and French companies. The gold from this coast gave its name to our *guinea*.

Abyssinia has rich deposits of gold, mostly



AFRICA—MINERALS AND MANUFACTURES.

unworked. It is here found in the form of nuggets, or in the river alluvium.

Diamonds are found in *Griqualand West* and the *Orange Free State*, and the chief centres are *Kimberley* and *Jagersfontein*.

The diamonds are found in a hard, blue rock, which is quarried and then exposed to weathering for a considerable time. When the rock crumbles the earth is washed away and the stones remain.

Copper is obtained from the south-west of *Africa*, both in British and German territory. Rich deposits exist in *Northern Rhodesia* and in the south of the *Congo Basin*. It is also found in *Western Sudan*, the *Bahr-el-Arab Basin*, and in *Algeria*, and there are probably rich deposits in *Morocco*, which at present are undeveloped.

To tap the copper resources of South-West Africa a railway has been constructed inland from *Port Nolloth*, and a similar line from the German port of *Swakopmund*.

The main line of railway has now been carried into the south of the Congo Basin to the *Katanga district*, and large quantities of copper will be exported in the near future.

Coal.—Rich deposits of coal are found in the *Wankie fields of Rhodesia*, and along the coastal plain of *Natal*. Poorer qualities, used on the railways, are found in the *Cape of Good Hope Province*.

The chief coal centres of *Natal* are *Dundee* and *Newcastle*, and much of this is now being sent direct to the coast for the use of ocean liners.

Iron is obtained from *Oran* and *Bona* in *Algeria*, where it is worked in open quarries. Rich deposits of iron ores, awaiting development, are to be found in the *land between the Nile and the Congo Basins*, and similar deposits exist on the *Eastern Plateau*, the land bordering *Lake Nyasa*, *Southern Rhodesia*, and the *Western Sudan*.

The natives of *Nyasaland* and on the *Eastern Plateau* forge spear heads and agricultural implements from the iron, but lack of fuel retards the full development.

The *Hartley Mines of Southern Rhodesia* have rich iron deposits.

Lead, Tin, Silver, etc.

Lead and *tin* are found in small deposits in the *Western Sudan*.

Lead, *antimony*, and *building stone* are other forms of mineral wealth obtained from *Algeria*.

Rhodesia has supplies of *silver* and *lead*.

Industries and Occupations.

Africa has no manufactures of any importance, and will probably never compete with the great manufacturing regions of the world. The distribution of her mineral wealth will not encourage their growth. European nations are developing the interior with the object of finding additional food supplies and raw material for the manufacturing areas of the world. Hence the chief occupations of the people are feeding flocks on the drier lands, practising agriculture in the more fertile areas, and collecting rubber and other products in the tropical forests.

Fez caps are manufactured at the town of *Fez* in *Morocco*. The carmine dye used for them is obtained from the kermes insect, which lives on the evergreen oaks found in the Atlas Region.

Constantine has a soap industry due to the growth of olives in the Tell Region.

The people of *Western Sudan* manufacture a noted blue cotton cloth, using the raw cotton and indigo grown locally. They are also clever workers in metal, leather, and glass.

Egypt manufactures coarse pottery in addition to a few cotton goods; and in *Abyssinia* the natives manufacture textile, leather, and metal goods for their own use.

In *Madagascar* there are a few textile manufactures, and hemp is woven into sugar bags.

In *South Africa*, where is the largest European population, manufactures are quite unimportant, leather, dependent upon the cattle reared, being the chief. The lack of fuel and labour is largely responsible for this. The unskilled labour required in the mines is largely supplied by the introduction of the *Kafir* from the plateau on the northern borders.

EXERCISES.

1. Draw a map of South Africa showing the regions rich in mineral wealth. Insert the railways joining these regions to the coast.

2. Name the chief localities in Africa noted for gold, copper, and coal.
3. Why has Africa no important manufactures?
4. What are the chief manufactures in South Africa, the Atlas Region, and Western Sudan? Give the natural conditions upon which each of these manufactures depends.
5. Compare the future development of Asia and Africa as manufacturing continents. In which of the two is there likely to be the greater development? Give reasons for your answer.

Routes.

The natural features of Africa offer serious drawbacks to carrying routes into the interior. The only routes, until quite modern times, were the beaten tracks of slave and ivory traders, but under European influence modern engineers have overcome the obstacles, and railways are being rapidly laid to tap the rich supplies of both mineral and vegetable wealth. The chief natural obstacles to internal communication are:—

- (1) A harbourless coast, bordered in some parts by desert and in others by a malarial plain.
- (2) The plateau surface, which not only makes railways difficult but prevents water communication by the rivers.
- (3) Great areas are covered with impenetrable forests, making it almost impossible to cut roads and railways through them, and telegraphic communication has only been made possible in these parts by laying cables in the river beds.

Atlas Region and Sahara.

Notice in the north-west a route parallel to the coast running from *Oran* in the west of Algeria to *Tunis* in the east. This railway is inland because of the Little Atlas barrier along the coast. Name the branches that run from it to the seaports on the coast, and also those to the desert interior.

At present there are no roads, no wheeled carts, and no river navigation in Morocco, the whole internal trade being done by mules or camels along narrow bridle paths. As the French develop this country they will probably extend the railways and make excellent roads, as they have already done in Algeria and Tunis.

From the Atlas Region and from the Mediterranean coast of Tripoli trace the caravan routes crossing the desert to the Sudan. These are shown by dotted lines. Much of the trade of the Niger Region and Lake Tchad is carried on in this way, because the plateau is bordered along the coast by an unhealthy forested plain, to which access is difficult.

Niger Basin and Guinea Coast.

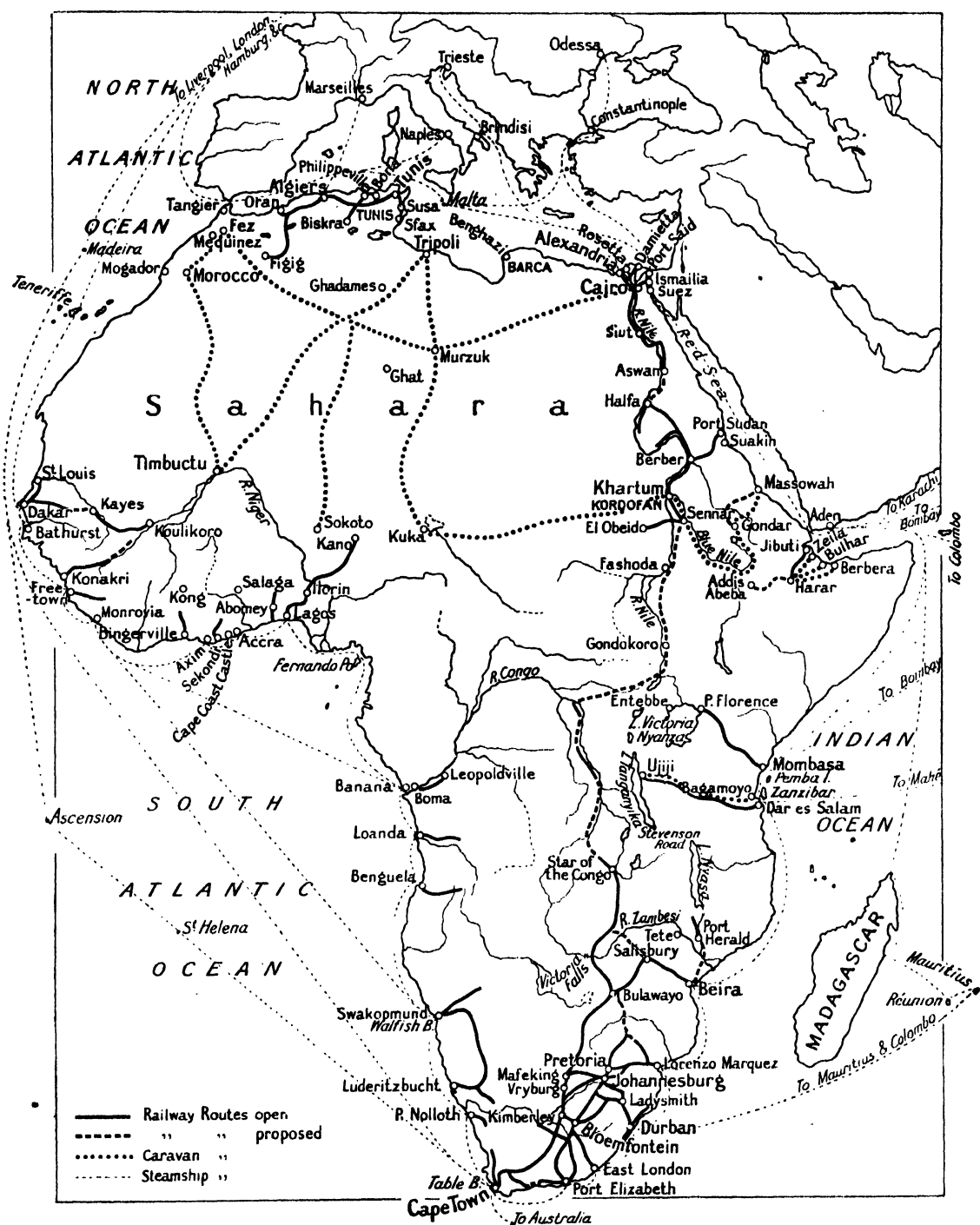
From the Guinea Coast trace the British railways from: (1) *Freetown*; (2) *the Gold Coast*; and (3) *Lagos*, into the interior. The French have a railway from *St. Louis*, at the Senegal mouth, to *Cape Verde*, and another from the *French Guinea* coast to the *Upper Niger*. Much of the trade of the interior finds an outlet by the rivers. British steamers navigate the *Lower Niger* and the *Bennue*, and French boats navigate the *Upper Niger*.

Many of the European possessions along this coast are not settlements of white peoples, but trading stations where some river forms an outlet. The future of this region depends upon the carrying of railways to the interior plateau to tap its rich resources.

The native trade routes run east and west either along the desert edge, where are the commercial centres of *Kano* and *Sokoto*, or along the forest edge through such centres as *Kong*, *Salaga*, and *Ilorin*.

Egypt, Egyptian Sudan, and Abyssinia.

Trace the main line of railway running from *Cairo* to *Khartum*. Notice that south of *Aswan* the line is broken to *Halfa*. At present communication in this part is only possible by water, but these places will eventually be linked together. Beyond *Khartum* the railway has been extended to *Sennar*, and is being continued to *Fashoda* on the Nile proper. Trace a branch line running to *El Obeid*, an important caravan centre in the west. The main line will eventually be linked to a railway from *Cape Town* which is being continued northward. When these two are joined there will be through communication by rail from *Cairo* to *Cape Town*. Another important route leads from *Berber*, at the Atbara confluence with the Nile, to *Port Sudan* on the Red Sea. This railway gives easy access to the sea for the products of Egyptian Sudan.



Scale, 789 miles to inch.

ROUTE MAP OF AFRICA.

River communication on the Nile is possible between *Cairo* and *Assiut*, and river steamers run from *Khartum* to *Gondokoro*, and also up the Blue Nile to the Abyssinian Plateau.

The Italians are pushing a railway from their port of *Massuah* on the Red Sea to *Gondar* on the Abyssinian Plateau, and the French from their port of *Jibuti* have a railway to *Harar*, the important centre in the south of Abyssinia. The remainder of the trade of this region finds an outlet by caravan routes to the British ports of *Berbera* and *Bulhar* in British Somaliland, or through French or Italian territory.

To the east of the Nile find the Suez Canal, which in its eighty-seven-miles course from *Port Said* to *Suez* passes through the *Bitter Lakes* and *Lake Timsah*. On an average ten vessels pass through it daily, of which seven are British.

Eastern Plateau.

The British have a railway from *Mombasa* on the coast to *Port Florence* on Victoria Nyanza. This railway has to ascend the steep edge of the plateau and to cross the eastern rift. From Port Florence steamers cross the lake to *Entebbe*, from which it is possible by road, steamer, and rail to reach Cairo.

Caravans of porters still do much of the trade with the interior. The routes taken by these are only beaten tracks, by which in earlier days slaves and ivory were brought to the Arab ports on the coast. The Germans are projecting a railway from *Dar-es-Salam* into the interior.

Congo Basin.

In the Congo Basin railways and roads are almost impossible owing to the dense forests, and most of the trade in the interior is done by water. A small railway from the coast to *Leopoldville* has been constructed to avoid the falls in the Lower Congo. Portugal has a railway through *Angola* to tap the rich coffee plantations of the plateau.

Railways are projected to join the Upper Congo to the Cape to Cairo route, and the French are constructing a railway through their territory.

Caravan routes from *French Equatorial Africa* lead *via* the *Ubangi River* to *Lake Tchad* and the *French Sudan*.

South Africa and the Zambesi Basin.

Trace a line of railway commencing at *Cape Town* in the south, which runs north-east along the borders of the desert *via* *Kimberley*, *Vryburg*, and *Mafeking* to *Bulawayo*. From the latter place follow the western branch, which crosses the Zambesi near the Victoria Falls, and has now been continued into the Congo Basin to the *Star of the Congo* to tap the rich copper supplies of the Katanga District. This is the line which will eventually be linked up with the Egyptian railway to Cairo.

From *Bulawayo* trace a line which runs through *Salisbury*, the capital and gold-mining centre of Rhodesia, to *Beira* on the Portuguese coast.

Trace a second line of railway running parallel to the line from Cape Town, which commences at *Port Elizabeth* and runs to *Johannesburg* and the mining towns of the Transvaal; and a third line of railway from *Durban* on the coast of Natal inland to the plateau edge at *Ladysmith*, and from thence sending one branch to *Johannesburg* and the other into the Orange Free State.

A railway also runs from *Lorenzo Marquez* on *Delagoa Bay* to *Johannesburg* and other towns of the Transvaal.

Short lines of railway run from *Port Nolloth* in British territory, and from *Swakopmund* in *German South-West Africa*, to tap the copper mines of the interior.

The Zambesi is navigated by steamers as far as the falls at *Tete*, and also up the Shire River to *Port Herald*, where a small line of railway runs into British Nyasaland.

Notice on your Surface Map how a road, using natural features, is possible from Lake Tanganyika *via* the *Stevenson Road* to *Lake Nyasa*, and then *via* the Shire River to the Zambesi. This should in the future be an important route into this part of Africa.

EXERCISES.

1. Name the chief obstacles which hinder the development of railways in the interior of Africa.
2. Name the chief rivers of Africa which are navigated by river steamers. What obstacles prevent through communication on these rivers, and how have they been overcome?
3. Draw a map of South Africa showing the

chief railways. Why are the railways more fully developed in this region than in other parts of Africa?

4. Name the chief railways controlled by Britain, France, and Germany, also those in course of construction by these Powers.
5. What will be the advantage of a railway from Cairo to Cape Town? Explain how far this railway has been constructed both in the Nile Region and South Africa.
6. With what object are France and Britain constructing railways from the Guinea coast to the interior? Where does much of the produce of Western Sudan now find an outlet? Give reasons.
7. Show what natural features the projected railway from Cairo to Cape Town could make use of.
8. What natural obstacles had to be overcome in constructing the Uganda railway from Mombasa to Port Florence on the Victoria Nyanza?
9. Describe a journey by rail, road, and river from Mombasa to Cairo.
10. What were the chief means of trade with the interior of Africa before railways were built? Name the parts of Africa where these means of communication are still being used.

Commerce and Ports.

Africa South of the Congo.

The surface features have hindered trade with other countries, but these have now been partially surmounted by the development of railway communications. The rapid development of mineral wealth, together with a more united and settled form of government, should cause an enormous increase of trade in the near future.

The scarcity of good harbours causes nearly all the export trade of the interior to be confined to the British harbours of *Cape Town*, *Port Elizabeth* and *Durban*, and the Portuguese ports of *Lorenzo Marquez* and *Beira*.

Cape of Good Hope Province.

In this province the pastoral industry is the most important. *Cattle* and *merino sheep* provide a large proportion of the exports, consisting of *wool*, *hides*, *skins* and *hair*. On the dry Karroos the rearing of ostriches has created a large output of *feathers*. Agriculture is carried on in the wetter regions of

the east, where *maize* forms the chief product, and in the district of Cape Town Mediterranean products are grown. Hence there are exports of *wheat*, *oats*, *barley*, *Kafir corn* and *maize*.

Both these agricultural and pastoral products are, however, unimportant as compared in value with the *diamonds* of Griqualand. These have been actively worked at Kimberley since 1869. *Copper*, obtained from *Port Nolloth*, is an increasing product.

The chief seaports are *Cape Town* and *Port Elizabeth*, while *Port Alfred*, *East London* and *Aliwal South* are of secondary importance.

Cape Town, situated on Table Bay and backed by the flat-topped Table Mountain, holds a position in the far south-west of the continent on the route taken by steamers to India and Australia. Its harbour, protected by a breakwater from the westerly gales, has become a very important coaling station. The main line of railway, which reaches inland to the Congo Basin, causes it to export not only the produce of the province itself but also that of the Orange River Colony, the Transvaal and Rhodesia. Its population is larger than that of any other South African town. *Simonstown*, on Simon's Bay, is the chief naval station of South Africa.

Port Elizabeth, in the east of the state, is the outlet of the agricultural and pastoral exports of the richer eastern half of the plateau. It is situated on an open roadstead and is now a fine town. Its chief exports are *wool*, *ostrich feathers*, *hides* and *diamonds*.

Port Alfred and *East London* lie to the east of Port Elizabeth, and *Aliwal South* is on Mossel Bay.

De Aar is at the junction of lines from the Cape and Port Elizabeth.

Natal.

The coastal plains produce *sugar*, *tea*, *maize* and *wattle bark* for export. *Cotton* plantations, recently introduced, promise an important export in the future. The large *coal* deposits provide a large export of this material. A large proportion of the produce of the Transvaal and Orange River Colony finds an outlet through the port of *Durban*.

Durban, on the inlet of Port Natal, is the chief port. Its trade has increased largely in recent years.

Orange River Colony.

The chief occupation in this country is *stock-raising*, but a rapidly increasing quantity of *grain* is being grown. The chief animal exports are *wool, mohair, hides, skins, eggs* and *butter*. *Diamonds*, found at Jagersfontein, provide the largest mineral export. This state, possessing no sea-board, carries its export material to the ports of Natal or the Cape Province.

Transvaal.

The chief export of this colony is the *gold* obtained from the Rand and other goldfields. This country carries on its external trade through the ports of Lorenzo Marquez (Portuguese East Africa), Durban (Natal), Port Elizabeth and Cape Town, to each of which it is joined by rail.

British South Africa.

<i>Chief Exports.</i>		<i>Chief Imports.</i>	
Gold . . .	£38,000,000	Foods . . .	£8,000,000
Diamonds . . .	12,000,000	Cotton goods . . .	3,200,000
Wool . . .	5,700,000	Machinery . . .	2,800,000
Ostrich feathers . . .	3,000,000	Apparel . . .	2,700,000
Hides . . .	2,000,000	Hardware . . .	1,900,000

The Bechuanaland Protectorate and South-West Africa (before European War 1914-19 was a German Colony).

These, consisting chiefly of desert lands, are of little commercial importance. *Copper* deposits in the latter have caused a development within recent years, while *diamonds* are also obtained.

The chief harbour along the coast is *Walvis Bay*, a British possession, but near to it the Germans have built an artificial harbour at *Swakopmund*, while farther south is the port of *Angra Pequena*, from which a railway runs inland.

Rhodesia and British Nyasaland.

The commerce of Southern Rhodesia has grown largely within recent years, and with increased railway facilities and agricultural development will shortly show a further progress. At present the rich mineral deposits form the greater part of the exports. *Gold, coal, silver, iron, copper* and *lead* are mined and exported. Agricultural and pastoral occupations also supply a large export. The products of this region find an outlet either through the Portuguese port of Beira or by the navigation of the Lower

Shire and Zambesi rivers. The railway from Port Herald to Blantyre facilitates the export of goods from the interior of Nyasaland.

Bulawayo is 1360 miles from Cape Town, and three and a half days' railway journey from it.

Salisbury is separated by only 370 miles from Beira.

Port Herald is on the Shire River.

Portuguese East Africa.

Apart from the through traffic which reaches the coast either through the Zambesi or the railways to the ports of *Beira* and *Lorenzo Marquez* from Rhodesia and the Transvaal, this large coastal province is quite unimportant. The unhealthy climate and the bad government are the two chief factors which have retarded development. Important ports such as *Zumbo* on the Zambesi, *Quilimane* and *Sofala* have fallen into decay since the slave trade has been abolished.

Lorenzo Marquez, on Delagoa Bay, is the coast terminus of a railway inland to the Transvaal, while *Beira*, at the mouth of the river Pungwe, is the terminus of another line inland to Southern Rhodesia.

Mozambique is the chief port for the local products, and *Inhambane* is chiefly engaged in exporting the rubber of the interior. Other exports are wax and ivory.

Madagascar.

The occupation of cattle-breeding and agriculture provide exports of *hides, cattle, rice, sugar, coffee, cotton, vanilla, tobacco* and *cloves*. The forests yield valuable *timber* in addition to *caoutchouc, gums, resins*, and *bark* for tanning.

Diego Suarez in the north, *Tamatave* in the east, and *Majunga* in the north-west, are the chief ports.

Western Sudan and Guinea Coast.

Britain and France have the largest share in the commerce of this region. The trade of Britain finds an outlet through the ports of Nigeria, while a great part of the French export is taken out through Senegal. Germany has some of the trade of the coastal plains.

Northern and Southern Nigeria.

The trade of these states is far greater than that of the other British West African

possessions. The coastal plains export *palm oil*, *rubber*, and *ivory*, and the plateau *coffee*, *cotton* and *cereals*. *Lagos*, *Forcados*, *Akassa* and *Calabar* are the chief ports.

Inland there are important trade centres in Northern Nigeria from which caravans carry the products of the interior plateau across the desert. Of these *Kano*, *Sokoto*, and *Kuka* are the chief.

Lagos, on an island near the western boundary of Southern Nigeria has under construction harbour works which will render it the chief port of the state.

Sokoto, *Kuka*, and *Kano* are populous native centres. The railway from *Kano* should divert their trade southward to the coast.

Chief Exports.

Northern Nigeria	Tin and palm produce.
Southern Nigeria	Palm produce and raw cotton.

The Gold Coast.

The chief exports of this region are the products of the tropical forests, but the increase in plantations is creating a large export of *cocoa*. *Gold*, mostly obtained from alluvium, has always been important, and the working of the reefs under British control will probably result in an increased output in the future.

Accra, the capital, *Elmina*, *Cape Coast Castle*, and *Axim* are important ports, while the railway from *Sekondi* to the interior will tend to increase the trade of that town. *Kumasi*, the capital of Ashanti, is the chief trade centre of that state, and *Salaga*, farther north on the Volta, is a native trade centre connected by caravan routes to *Ilorin* on the east and *Kong* on the west.

Exports: *Cocoa*, *gold*, *palm produce*, *rubber*.

Sierra Leone.

The trade of this British possession consists largely in exporting such produce of the tropical plain as *palm oil*, *kola nuts*, *gum-copal*, *oil-seeds* and *ginger*.

Freetown, the capital, at the mouth of the *Rokelle River*, has the best harbour on this coast. It is an important coaling station and is strongly fortified.

British Gambia.

This state includes the lower navigable portion of the Gambia River, and ex-

ports chiefly ground nuts, palm kernels, bees' wax and hides.

Bathurst, on an island at the mouth of the river, is the only important town. Most of the trade with the interior is carried on by means of river communications.

Senegal and Niger Territories (French).

The greater part of the interior plateau is under French control, with outlets to the coast in Senegal, French Guinea, the Ivory Coast, and Dahomey. The long upper navigation of the Niger to *Bamako*, and the railway connection between *Kintlikoro* and *Kayes*, cause many of the products of the interior to find an outlet *via St. Louis*, at the mouth of the Senegal, and *Dakar*, under the shelter of Cape Verde. The chief exports of this region are *ground nuts*, *oil-seeds*, *cattle*, *rubber*, *skins* and *wool*, and the trade centres, in addition to the towns named above, are *Segu*, *Timbuctu* and *Ilo*.

St. Louis, at the mouth of the Senegal, is, owing to the shifting nature of the river channels, not such a noted port as *Dakar*, where important harbour works are now being constructed. The two towns are connected by rail.

Timbuctu, near the northern bend of the Niger, is a starting place for caravan routes across the Sahara. *Segu* is an important river port.

French Guinea.

French Guinea extends from the plateau to the coast and exports much of the produce of the interior plateau. A road and a railway to connect its chief port of *Konakry* to the navigable Upper Niger are now in course of construction. The chief exports are *rubber*, *palm kernels* and *ground nuts* from the tropical plain, *cattle* from the Futa Jallon Highlands, *gold* from the alluvial deposits and quartz reefs, and *coffee*.

Konakry is the only important port, the surf-beaten coast, the marshy lagoons, and unhealthy swamps making the whole coast difficult of access.

French Ivory Coast.—The chief products of *coffee*, *rubber*, *coco-nuts* and *mahogany* are exported from *Bingerville* and *Bassam*. *Kong* is a large native trading centre in the interior.

Dahomey.—*Maize*, *palm-oil*, *copra* and *rubber*

are exported from *Porto Novo* and *Whydah*.

Lake Tchad Territories.—*Gums, millet and ivory* from this region find an outlet mainly by caravan routes across the Sahara.

Togoland exports *palm-oil* and *kernels, cotton, and maize*. The shore is harbourless and surf beaten. *Bismarckburg* is the chief inland centre for trade.

Kamerun Colony.—This area exports *palm-oil, rubber and ivory* from the forests, and *cocoa, coffee and spices* from the plantations. *Duala* and *Victoria* are the chief ports.

The Nile Basin—Abyssinia.

Egyptian Sudan.

The products of this country have increased largely since the British influence has become paramount. Railway and irrigation schemes will make this increase more pronounced. A great part of the trade finds an outlet through the railway from Berber to Port Sudan. Much of the produce of the north and west is carried by the rail and river navigation of the Nile Valley. The chief exports are *gum, ivory, ostrich feathers, dates, cereals and cotton*.

Port Sudan and *Suakin* are on the Red Sea coast, where the easterly bend of the Nile makes it possible to build a railway only 260 miles in length to connect Berber with Port Sudan.

Khartum, at the confluence of the Blue and White Nile, is the chief trade depôt of this region. It commands both the railway communications and river navigation of the Sudan.

El Obeid, in Kordofan, is the converging centre of many caravan routes.

Egypt Proper.

The vast irrigation works and railways which have been constructed in Egypt have increased trade to a great extent. Large supplies of *cotton, wheat, maize, sugar, rice and pulses* are exported. Nearly all this trade passes through *Alexandria*.

Alexandria has been improved as a port by the construction of extensive harbour works and docks. It is situated to the west of the Nile delta.

Rosetta and *Damietta* are small seaports which are decreasing in importance.

Port Said is an important coaling station and depôt for Eastern goods at the Mediterranean entrance to the Suez Canal.

Abyssinia and the Eastern Horn of Africa.

The trade of this region is small. Abyssinia possesses no sea-board, and the products reach the coast through Italian, French, or British adjoining territory. Many products of Northern Abyssinia find an outlet through the Italian port of *Massuah*. The chief exports of Abyssinia are *coffee, hides, wax, ivory, rubber and gum arabic*.

Sokoto, in the Tokazze basin, is an important market, and does a large trade in salt bricks.

Massuah is in Italian Eritrea, and is built on a coral islet.

Berbera, Bulhar and Zeila are the chief ports of British Somaliland. Berbera has the best harbour.

Atlas Region and the Sahara.

Morocco.

The dislike of Mohammedan people to European influence has caused the external trade to be small in proportion to the large, fertile area of the interior. The chief exports are *hides, wool, and oxen*, obtained from the pastoral mountain lands, *eggs*, a largely increasing export, *wheat, olive oil, and almonds*. The chief ports are *Tangier, Tetuan, Casablanca, and Mogador*, the inland centres of trade being *Fes, Mequinez, and Morocco*.

Tangier, near Cape Spartel, was once a British possession. It is the chief centre of foreign commerce of the country. Its importance is increased by its healthy and attractive situation.

Tetuan, a few miles south of Ceuta, is largely occupied by Jewish traders.

Casablanca, on the Atlantic coast, has become one of the most important seaports, doing one quarter of the country's trade.

Fes is the chief commercial centre of the country, and is famous for its *silks, carpets, leather and caps*.

Algeria and Tunis.

Remarkable success and prosperity have followed the French control of these colonies. The agricultural lands are responsible for a large export of *wine, wheat and olive oil*;

the forests export *cork*; the drier plateaux produce *sheep, skins, wool, and esparto grass*. The chief seaports are *Algiers, Oran, Tunis and Bizerta*. *Constantine* is an important inland trade centre of Algeria.

Algiers has an excellent position on a fine harbour. It is now an important coaling station.

Oran, the second largest port, is the chief outlet of the west.

Constantine is an important grain market.

Tunis owes its importance to its position on the Silician Strait. There is a large export of phosphates

Tripoli.

Italian control of this state may lead to an increase in her exports. At present the chief commerce consists in exporting *ostrich feathers, ivory, sponges, skins and dates*. The two chief ports are *Tripoli* and *Benghazi*.

Tripoli is only accessible to small steamers.

It owes its trade almost entirely to the trade along the caravan routes which converge on it.

Benghazi trades chiefly with Malta. Its harbour is very shallow.

The Sahara.

The only commercial product of the desert itself is *salt*, and hence all the trade consists in the transit of commercial products between the Mediterranean and the Sudan.

The Great Lakes and the Congo.

Until the latter part of the nineteenth century the trade along the *East African sea-board* was controlled by Arab and Hindu traders, intent on obtaining slaves and ivory from the interior. Later, Portuguese sailors made settlements along the coast, but these were not successful, and the greater part of the trade of this region was controlled by the Sultan of Zanzibar. In the latter part of the nineteenth century Britain and Germany obtained control, and now a regular steamship communication is maintained. The chief exports are *rubber, ivory, copra, hides, grain and hemp*.

The chief ports are situated where there are breaks in the coral formation. The most important harbours controlled by Britain are *Mombasa* and *Zanzibar*, while *Dar-es-Salam, Tanga* and *Bagamoyo* are the chief ports of

what was German territory until the European War of 1914-19).

Mombasa was an important port of both the Arabs and the Portuguese. It is the terminus of the Uganda Railway and is connected with the mainland by a massive iron bridge. It has a monthly mail service with Britain. *Witu*, on the Tana delta, is noted for its *rubber* export.

Zanzibar is one of the largest seaports on the East African coast. The chief exports are *cloves, spices and coco-nut* products.

Pemba. This island has similar exports to Zanzibar.

Nairobi is an important inland trade centre, and is the headquarters of the Uganda railways.

Dar-es-Salam has one of the best harbours along the coast. It is the terminus of many caravan routes.

Bagamoyo, opposite to Zanzibar, was formerly an important caravan route terminus, but is decreasing in importance, due to the competition of Dar-es-Salam.

British East Africa.

<i>Chief Exports.</i>		<i>Chief Imports.</i>	
Cotton (raw)	£ 300,000	Cotton goods	£ 550,000
Oil seeds	200,000	Grain	120,000
Hides	150,000	Provisions	100,000
Copra	32,000	Machinery	100,000

German East Africa (before War 1914-19).

Exports: *Rubber, copra, ivory, coffee, sisol.*

Zanzibar.

Exports: *Cloves, £ 350,000; copra, £ 200,000; ivory, £ 45,000.*

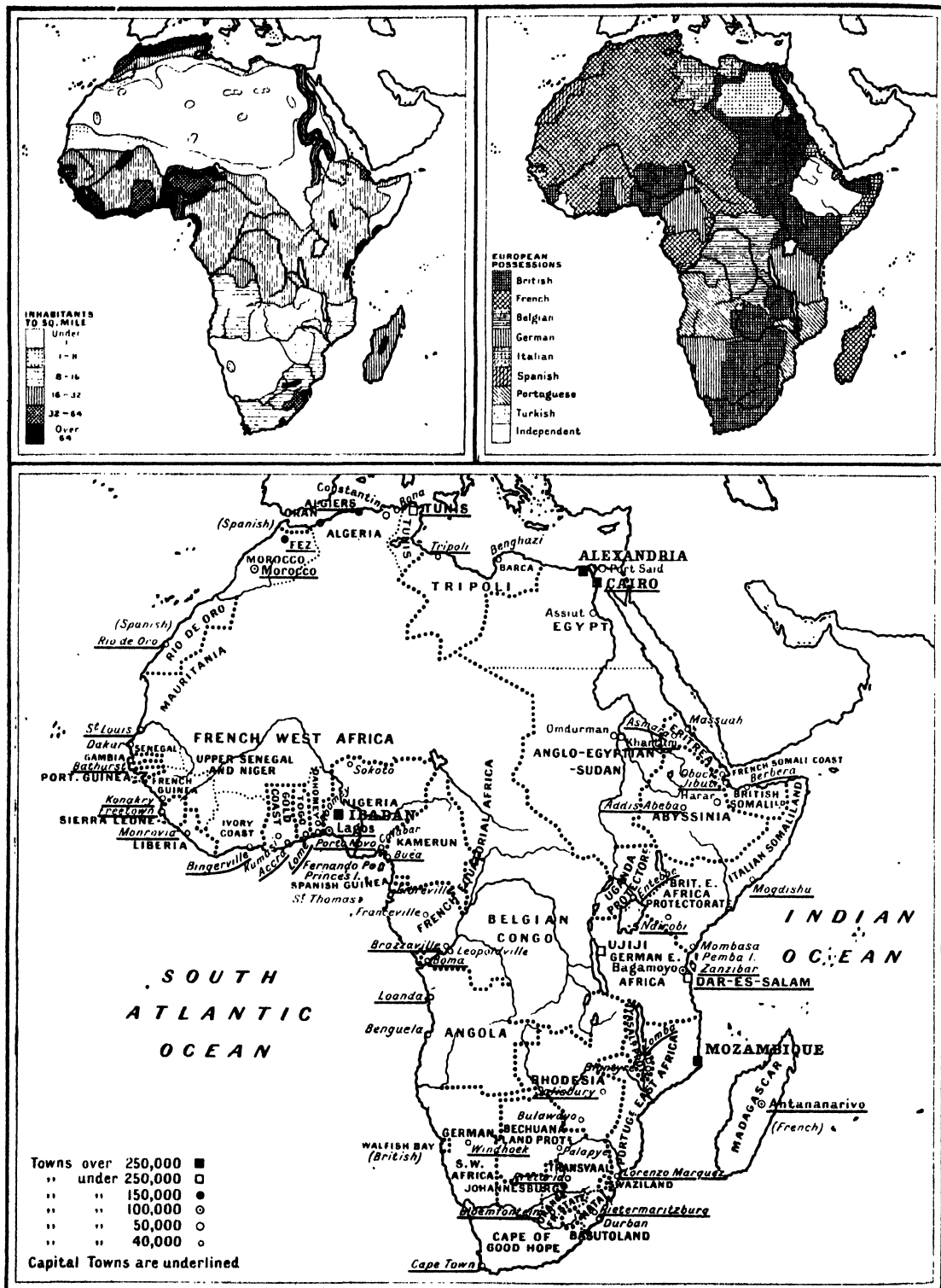
Congo Basin and Western Seaboard.

The trade of this region did not develop until the latter half of the nineteenth century. It was not until railway construction had overcome the obstacles to river navigation that the interior could be fully developed. Even now the shifting nature of the river channels and the silting up of many of them, added to the malarial climate, are obstacles which prevent rapid development.

The chief exports of the *Congo State* are *rubber, ivory, palm-oil and nuts and copal*. The chief imports are manufactured goods, especially those in *cotton*. *Banana* and *Boma* are the chief seaports.

French Equatorial Africa has products similar

AFRICA—POPULATION AND EUROPEAN POSSESSIONS.



AFRICA—POLITICAL DIVISIONS.

to the Congo State. *Loango* and *Libreville* are the chief ports.

Portuguese Angola exports *coffee* and *rubber* from *St. Paul de Loanda*, *Benguela* and *Mossamedes*.

EXERCISES.

1. Through what ports do most of the products of the inland provinces of the Orange River Colony and the Transvaal find an outlet? Name the chief routes by which these products are taken.
2. Describe the position of five of the chief seaports of South Africa and the routes leading to them. State the products which find an outlet through each.
3. Show how the distribution of the railways of South Africa has been determined by the sources of the mineral wealth.
4. What are the natural obstacles to the development of the Guinea Coast? Show how these obstacles determined the direction of the natural routes.
5. Describe the position of three of the most important seaports of the Guinea Coast. Name the products they will export.
6. Describe the position of the chief ports of the Red Sea and the trade of each of them.
7. Explain how the trade of Alexandria differs from that of Port Said.
8. Name the chief exports of Morocco. Show how these could probably be increased under a more settled government.
9. Draw a map of the Sahara and insert the chief caravan routes.
10. State the position of the following ports and name the regions of which they form an outlet: Boma, Mombasa, Loanda and Libreville.

and by comparing this with the Climatic and Vegetation Maps you will see the reason.

The original inhabitants of Africa south of the Sahara were *Bushmen*, *Hottentots*, *Bantus* and *Negroes*. The Bushmen, a very backward race, and the Hottentots, a pastoral people, have been driven to the Kalahari Desert in the south-west by the stronger Bantu races invading from the north, and by European emigrants pushing into the interior from the south.

The *Bantu* races occupy the whole of

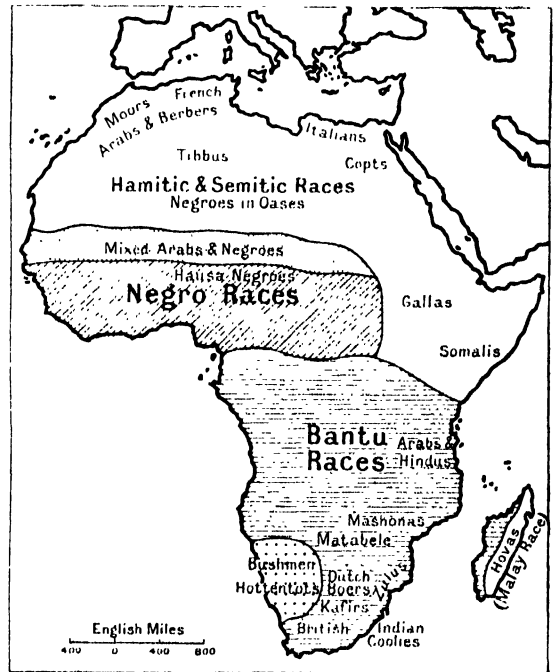


Fig. 23.—Africa, Races of Mankind.

Peoples—Distribution of Population.

Map 56 shows the distribution of the population. Name the parts where the population is densest. Compare the population in the Niger and Nile valleys with that of the Sahara. The greater fertility of these basins allows a denser population than that of the desert, where settled life is impossible except in the oases.

Draw a similar comparison in South Africa between the east and the west. The population is denser in the more productive east, and the patches of darker shading show where mineral deposits have caused an increased number. The west is thinly peopled,

Central Africa. They have brown skins and woolly hair. On the plateaux they are strong and well developed, and are engaged in agriculture and cattle-raising. In the damp tropical plains the ill-effects of the climate have caused them to be both mentally and physically backward. Both the *Kafir* and *Zulu* belong to the Bantu race.

The *Negro* occupies the Sudan Region to the borders of the Sahara Desert.

At an early age the *Egyptians*, *Abyssinians*, *Berbers* and *Moors* of the Atlas Region settled in Northern Africa, and were followed later by *Arab invaders*, who spread right across both *Egyptian* and *Western Sudan*,

driving the weaker *Negro tribes* to the coastal plain.

The *Arab* now is found not only in the Atlas Region and Egypt, but he is the chief trader of the desert, whilst in the Sudan he is a nomadic shepherd on the desert border. *Mixed tribes of Arabs and Negroes* occupy much of the Sudan Plateau, and hence Mohammedanism is the chief religion. *Arab and Hindu ivory and slave traders* also settled along the east coast, and *Zanzibar* was a great slave market in early times.

In more recent times the *Dutch, Portuguese, British, French and German* peoples have settled, causing a large European element, especially in the south.

Stanley found in the Aruwimi Basin a race of pygmies whose intellect was little better than that of animals. The ease with which these people can find food, clothing, and shelter, together with the

effects of the climate, cause them neither to develop their physical nor mental powers.

The *Hansa Negroes* of the Western Sudan are capable farmers, skilful workers in cotton, leather, and metal, and clever traders.

The *Negro of the Coastal Plain* is very backward. The drawbacks of the climate and contact with the unscrupulous slave trader have caused him to sink in the social scale.

The *Tibesti Mountains*, where owing to the higher ground there is a small rainfall and consequent vegetation, are occupied by the *Tibbus* of the Negro race. Negroes are also found in the oases.

The *Mohammedan Arab invasion* which swept across Northern Africa from east to west left untouched the *Plateau of Abyssinia*, which was too difficult of access. Hence to-day the Abyssinians still profess an ancient form of Christianity.

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER VII.

NORTH AMERICA.

CONTENTS.

World Position and Size—Seas, Coasts, Islands.
Surface.
Climate.
Vegetable and Animal Productions—Fisheries.
Minerals—Manufactures.
Routes—Railways—Canals and Waterways—Route Towns—Seaports.
Commerce.
Population.

MAPS.

57-60. Climatic Maps.
61 Vegetation.
62. Vegetable and Animal Products.
63. Minerals and Iron and Steel Manufactures
64. Showing other Manufactures.
65. Routes.
66. Political.
67. Population.

World Position and Size.

North America lies roughly between 10° and 70° N. latitude. It is washed by the Atlantic Ocean on the eastern side and the Pacific Ocean on the western, and is thus well situated for commerce.

The area is 8,250,000 square miles, being approximately twice that of Europe and not quite half that of Asia. The greatest width of the continent is about 3000 miles.

Across the Isthmus of Panama a canal has been cut from *Colon* on the Atlantic to *Panama* on the Pacific, making North America really an island. The canal, when opened, will save 6000 miles between *London* and *San Francisco*, and 9000 miles between *New York* and *San Francisco*, besides shortening the sea routes from Britain to the east coast of Asia and Australia.

Seas, Coasts, and Islands.

Fig. 24 shows, unshaded, the part of North America which is more than 400 miles from the sea. Compare this figure with similar ones of Africa, Asia, and Europe. North America, except for the narrow isthmus in the south, is entirely surrounded by water, and has a longer coast-line than any other continent except Europe.

The river estuaries along the east coast make good harbours, especially between

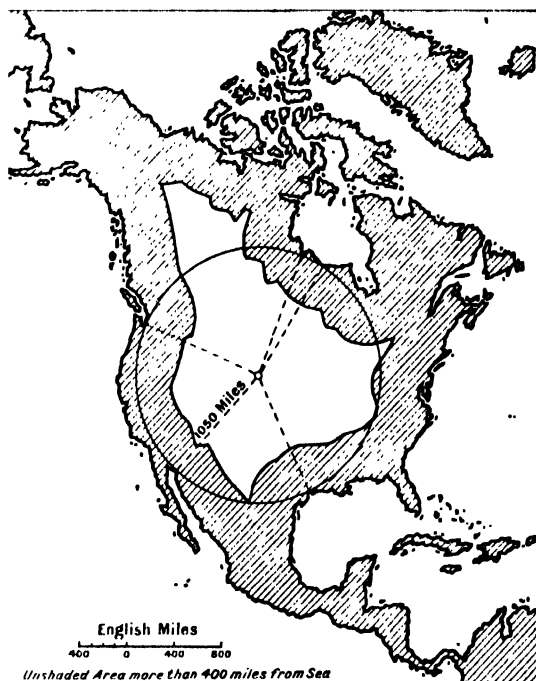


Fig. 24.

Labrador and *Chesapeake Bay*. South of that the harbours, although shallow, have been artificially improved.

Hudson Bay, on the north, is a shallow sea bordered by low-lying land. Being ice-bound for more than half the year, it is of little value for commerce.

Between Alaska and the mouth of the river Columbia the coast is deeply indented, but south of that there are few openings, and San Francisco is situated on the only harbour of any size.

The north coast is practically useless owing to the intense cold.

Islands.

The *Arctic Islands*, although possessing good harbours, are practically useless owing to the ice.

Newfoundland is an undulating land of lake and forest.

The *Bermudas* are a group of coral islands in the Atlantic Ocean belonging to Britain. They export fruits and vegetables to the east coast of North America. *St. George* is an important naval station, and *Hamilton* is the capital.

The *West Indies* consist of the large islands of *Cuba*, *Jamaica*, *Haiti*, and *Porto Rico*, and a number of smaller islands, including the *Bahamas* and *Windward Islands*, *Barbados*, and *Trinidad*.

EXERCISES.

1. What is the exact position of the Panama Canal? What will be its commercial advantages to: (a) the United States, and (b) the United Kingdom?
2. Compare the coast-lines of Europe and North America and show the advantage of each for trade.
3. Draw a contrast between the Pacific and Atlantic shores of North America. Show the connections of both oceans with the Arctic.

Surface.

North America can be divided into three natural regions—(1) The Western Highlands; (2) the Central Plain; and (3) the Eastern Highlands. The general direction of these is from north to south, and differs from the general east to west direction of the surface features of the Old World.

The Western Highlands.

These form a broad system of mountains stretching from *Alaska* in the north to

the *Plateau of Mexico* in the south, and consist of three distinct ranges. The Rockies consist of many parallel ridges

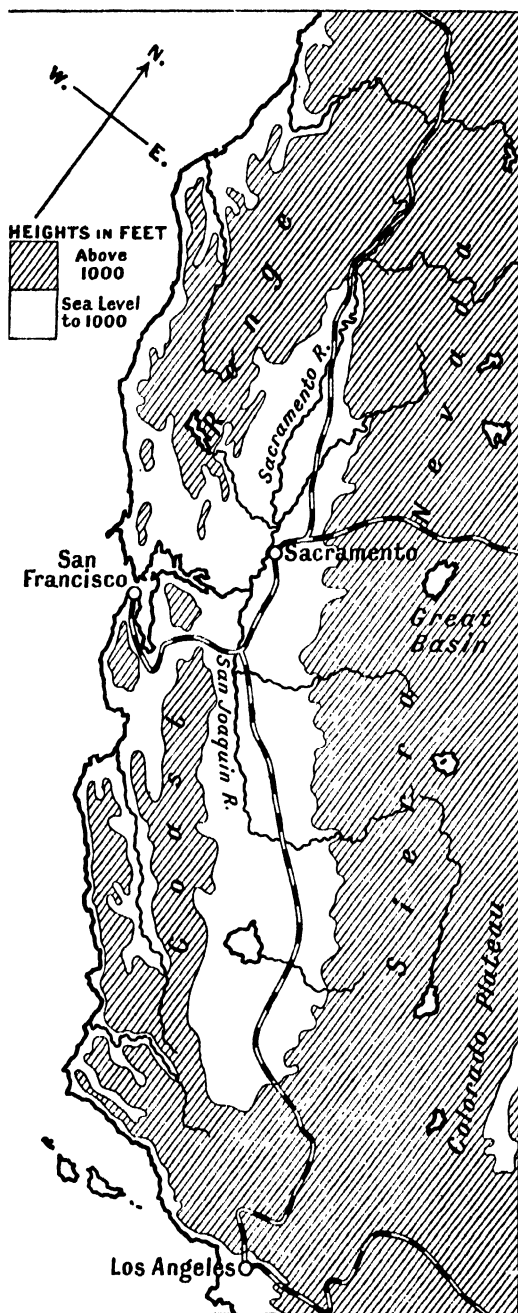


Fig. 25.—Position of San Francisco.

rising steeply from the elevated plains on their eastern border. They are separated from the *Western Chain* by

plateaux, narrow in the north but broader and more arid in the south. In the north, where it descends steeply to the coast, it is known as the *Cascades*, and farther south in the United States as the *Sierra Nevada*. The Western Chain is separated from a third and lower *Coastal Chain* by a deep trough. In the north the trough is submerged, and the Coastal Chain forms islands, of which the chief are *Queen Charlotte* and *Vancouver Island*. Farther south the

The Basin of the *St. Lawrence*.

The *Mississippi* Basin.

As it is possible to travel from the far north to the far south of this plain without rising more than 1000 feet, most of the rivers are navigable for the greater part of their course.

Notice on your map that the sources of the Mississippi and the St. Lawrence are within a few miles of each other, making easy communication possible between these two great systems.



Fig. 26.—St. Lawrence and the Great Lakes.

Coastal Chain forms part of the mainland, ending in the long peninsula of *Lower California*.

The Central Plain.

This stretches from the cold, frozen Tundra on the north to the Gulf of Mexico in the south, and can be divided according to its drainage into the following basins:—

The *Mackenzie* Basin.

The Basins of the rivers flowing to *Hudson Bay*.

The River Mackenzie.

The *Athabasca* drains the eastern slope of the Rockies and flows north to the lake of the same name. When the main stream emerges from *Great Slave Lake* it is known as the *Mackenzie*, and flows north to the Arctic Ocean, receiving the surplus waters of the Great Bear Lake by an eastern tributary. Although navigable for 2000 out of its 2500-mile course the river is of little value, flowing through a region of little commercial importance.

The Rivers flowing to Hudson Bay.

The *Saskatchewan* rises in the glaciers of the Rockies and flows across the plain to *Lake Winnipeg*. The *Red River of the North* enters the same lake at the southern end. The outlet of this lake

are close together. A slight elevation, known as the *Height of the Land*, forms the water-parting between them. The upper course of the *St. Lawrence*, known as the *Ste. Louis*, flows into *Lake Superior*, a huge sea of fresh water as large as Scotland. This lake is joined to *Lake*

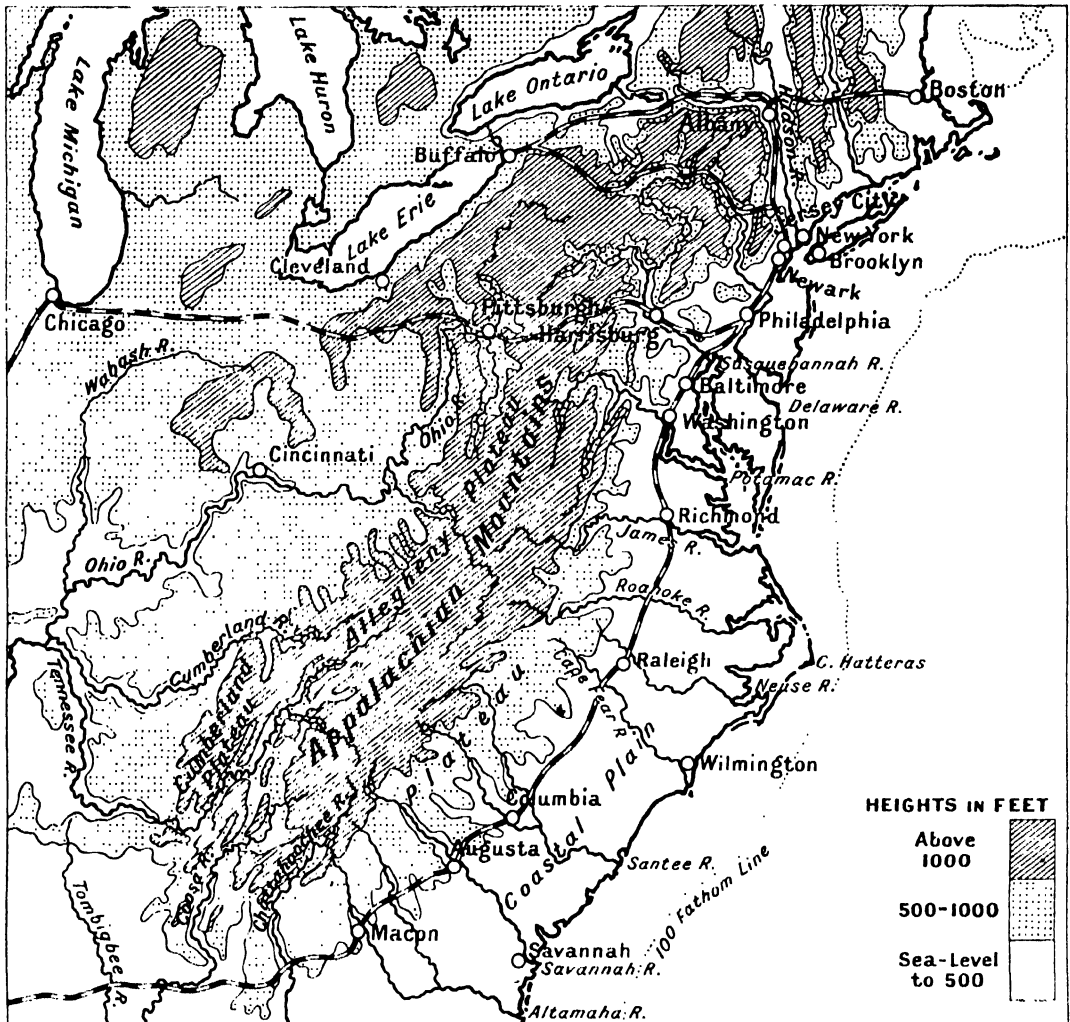


Fig. 27. The Appalachian System.

is the *Nelson*, which empties into Hudson Bay.

The river *Churchill* finds an outlet north of Nelson River.

The St. Lawrence and the Great Lakes.

We have already noticed that the sources of the *St. Lawrence* and the *Mississippi*

Huron by the *St. Marie River*. *Lake Michigan* is a southern extension of *Lake Huron*. *Huron* and *Erie* are at the same level, and the *Detroit River*, which joins them, is navigable for steamers; but between *Erie* and *Ontario* there is a drop of 300 feet. In the *Niagara River* joining them are the famous *Niagara Falls*, divided into the *Canadian* or

Horse-shoe Falls and the *American Falls* by a small island. *Lake Ontario* is as large as Wales, and the St. Lawrence leaves it as a broad stream, but narrows later to cut its way through the Eastern Highlands, and here forms many falls. *Montreal* is situated at the confluence of the *Ottawa River*, which drains the steeper land on the north of the river, forming waterfalls. Below *Quebec* the river widens to a long, deep estuary, in which is situated the island of *Anticosti*.

The chief drawback to the St. Lawrence is that it is ice-bound for over four months of the year. Though the entrances to its estuary on either side of *Newfoundland* are narrow and difficult of navigation yet ocean-going steamers navigate it to *Montreal*, while large lake steamers reach as far as *Duluth* and *Port Arthur* on Lake Superior.

The Mississippi.

The low water-parting between this river and the St. Lawrence causes it to be navigable for the greater part of its 2000-mile course to the Gulf of Mexico.

The *Missouri* is longer than the main stream, and joins it at *St. Louis*. The *Yellowstone* rises in a volcanic district, known as the Yellowstone National Park, where lava flows; extinct volcanoes and hot springs are evidences of great internal earth movements. This river flows to the Mississippi, as does also the *Platte River* farther south. The *Arkansas* and the *Red River* are the two chief remaining rivers which drain this slope to the great Mississippi stream. All of them cross the drier, more elevated plains of the west, and in doing so cut gorges or canyons. For the greater part of the year they flow as narrow, winding streams in the bottom of these gorges, but rise considerably with the melting of the snows in the Rockies.

Draining the gradual slopes of the Eastern Highlands are the *Ohio*, rising not far from Lake Erie, and the *Tennessee* and *Cumberland* farther south. The Ohio and Missouri are navigable for a great part of their courses, and as their confluences with the main stream are not far removed from each other they make a great water communication between the east and the west.

The Eastern Highlands.

Notice a belt of higher ground running parallel to the Atlantic coast, and

seldom reaching above 5000 feet. This is known as the *Appalachian Mountains*, and is continued north of the St. Lawrence estuary in the *Plateau of Labrador*. These mountains consist of many parallel ranges, and are the remains of a much denuded higher ridge.

The Central and Southern Appalachians.

Fig. 27 shows this system south of New York. In the south the mountains are higher and broader. Notice that the Blue Ridge forms the highest part, and this is separated by a deep valley from the Allegheny and Cumberland Plateaux

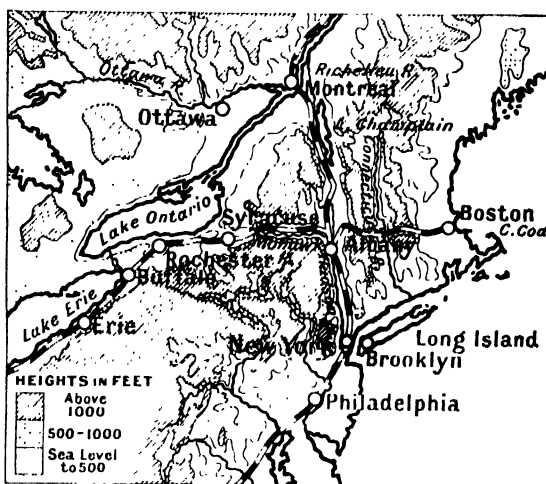


Fig. 28. Hudson-Mohawk Valley and position of New York.

which slope gradually westward to the Central Plain.

The Appalachians form a water-parting between the eastern tributaries of the Mississippi (which in their upper courses cut a difficult course across the plateau) and the rivers which flow direct to the Atlantic coast from the eastern side of the ridge. These latter have a rapid course from the mountains to the plateau edge, and here form falls where they descend to the coastal plain, hence the edge of the plateau is known as the *Fall Line*. Note the rivers which flow to the Atlantic coast, all of which form deep navigable estuaries.

The Hudson Valley.

Fig. 28 shows that the Hudson flows due south to New York, with a mountainous region on either side of its valley.

Notice on the map the *Mohawk* tributary, whose source is not far from Lake Erie. The Hudson-Mohawk valleys form a natural gateway through the Appalachians, and the convergence of routes using this gateway on *New York* has made that town second only in importance to London of the towns of the world.

The New England and Acadian Highlands.

This region, stretching from New York northwards to the St. Lawrence estuary, has a deeply indented coast with a rugged, forested interior. The mountains are continued through the peninsula of *Nova Scotia* to *Sydney* and *Cape Breton Islands*, while *Newfoundland* belongs to the same system.

The Labrador Peninsula.

This is a continuation of the Eastern Highlands, and connects them to the saucer-like ridge which surrounds Hudson Bay.

EXERCISES.

1. Contrast the river systems of British North America and Russian Asia, and show why the former are more valuable for commerce than the latter.
2. Describe the Appalachian Mountain system south of New York. Show how it forms a water-parting, and draw a contrast between the rivers flowing direct to the coast and those flowing inland to the Mississippi.
3. Show how surface features have made (a) New York, (b) St. Louis, and (c) San Francisco important.
4. Describe the Mackenzie, and compare it with the Obi.
5. Show where the river systems of the Central Plain nearly meet, and explain why for the greater part of their courses all these rivers are navigable.
6. Describe the Mississippi and its tributaries. Show the value of this river as a means of communication.

Climate.

From a study of the Climatic Maps we can divide North America into the following climatic regions :—

The North-West Highlands, having an equable temperature with rain through-

out the year. This rainfall is greatest along the coast, and decreases on the interior plateaux.

The South-West Highlands, reaching as far south as Mexico, having extremes of temperature with abnormal summer heat. Little or no rain falls throughout the year, especially on the desert plateaux.

The Eastern Central Plain, subjected to great extremes, and having a small rainfall, most of which occurs in summer.

The Western Central Plain, subjected to greater extremes than the preceding, and having less rain.

The North-Eastern Highlands, having a lower temperature and less rainfall than the lands in the same latitude on the west.

The South Eastern Highlands, having an equable temperature with rain throughout the year.

Central America and the *West Indies*, having a warm climate, with little difference between summer and winter. Rain falls throughout the year, but most during the summer months. The West Indies get a heavy summer rainfall.

Upper California has a Mediterranean type of climate, feeling the influence of the warm, wet westerly winds during the winter, and the drier Trade winds from off the continent in summer.

The cold Labrador Current brings down with it the Arctic drift ice, which in the spring and early summer is a danger to shipping. With the ice-floes come quantities of seals to the Newfoundland seas, and the hunting of these for their blubber is an important summer occupation.

The meeting of the Gulf Stream and the Labrador Current off the shores of Newfoundland causes thick fogs around that island.

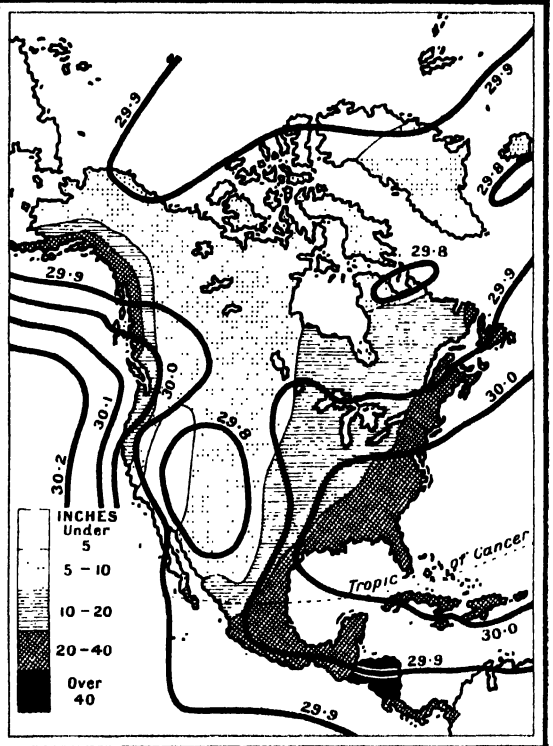
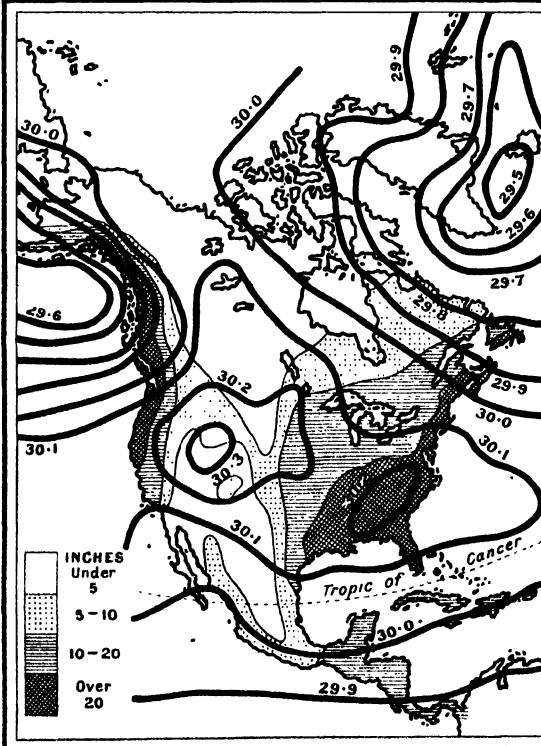
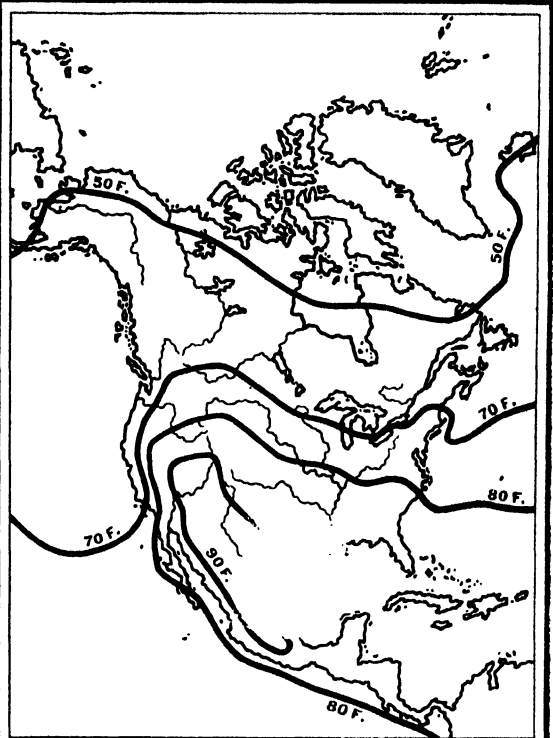
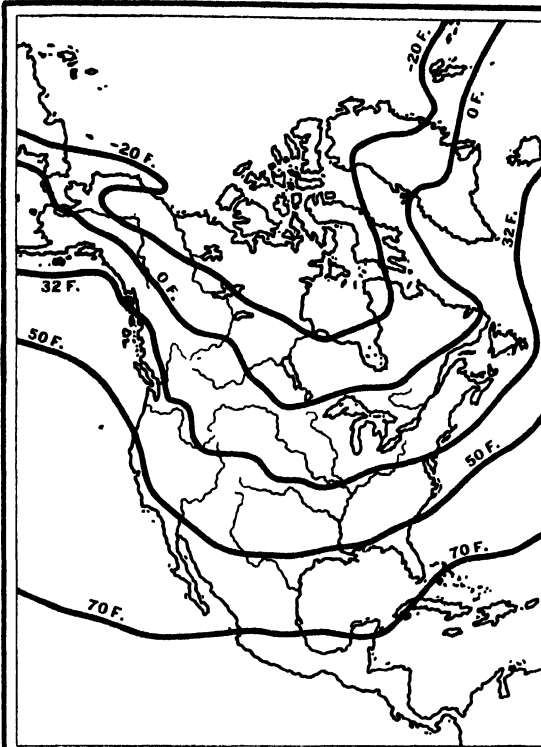
Compare the ranges of temperature in Labrador on the fiftieth parallel of latitude with those of regions in the same latitude on the western shores. This difference in climatic conditions causes a marked contrast in the vegetation of the north-eastern and north-western margins.

EXERCISES.

1. What is the path taken by the Atlantic drift ice? Why is there little drift ice in the Northern Pacific? Why do ocean

JANUARY ISOTHERMS.

JULY ISOTHERMS.



JANUARY ISOBARS & WINTER RAINFALL.

JULY ISOBARS & SUMMER RAINFALL.

- liners between north America and Europe take a more southerly course during the spring and summer months?
2. Compare the climates of the western shores of Europe and North America which fall within the same parallels of latitude. Give reasons for any points of similarity in both.
 3. State the course taken by the isotherm of 32° F. in January, and account for its direction.

Vegetable and Animal Productions.

The vegetation possible being largely determined by climate, we may divide North America into vegetation regions which coincide with the climatic divisions of the preceding section.

North-West Highlands.—Map 61 shows a forested area along the coast, stretching from the Yukon Basin to California. The equable temperature and the heavy rainfall cause the mountains to be forested, while the coastal slopes are thickly timbered with Douglas firs and other trees. The interior plateaux are much drier, but the utilisation of the river system makes possible the growth of *grain* and *fruits*.

The southern part of *British Columbia* is very fertile, and produces *fruit*, particularly pears. *Salmon* are found in the rivers. These two products give rise to an important *canning industry* in the coast ports.

Between the coast range and the Cascades is a fertile valley watered by the *Willamette*, which flows northward to Puget Sound. This fertile area grows quantities of *wheat*, and *Portland* exports *wheat*, *fruit*, and *timber*, in addition to the *salmon* obtained from the Columbia River.

The *Californian Valley* is remarkably fertile, and having a Mediterranean type of climate grows the products of that region, the chief being *wheat* and *fruits*.

The *Idaho Plateau*, drained by the Snake River and the Great Salt Lake Basin are too dry for agriculture, and form poor grass lands, except in the neighbourhood of Salt Lake City, where irrigation has made farming possible.

South-West Highlands, south of San Diego, is a dry region, forming poor grass lands in Lower California and desert plateaux in the interior.

The Colorado Plateau, New Mexico, and Arizona are all desert areas, for the most part thinly populated.

The Central Plains in the north consist of barren land or Tundra, incapable of supporting any vegetation except mosses and lichens. South of this is a belt of Forest Land, reaching as far south as the Great Lakes. The remainder of the plain can be divided into two areas. The eastern half, known as the Prairies, consists of rich cultivated land, and the western, or drier half, forms Grass Lands.

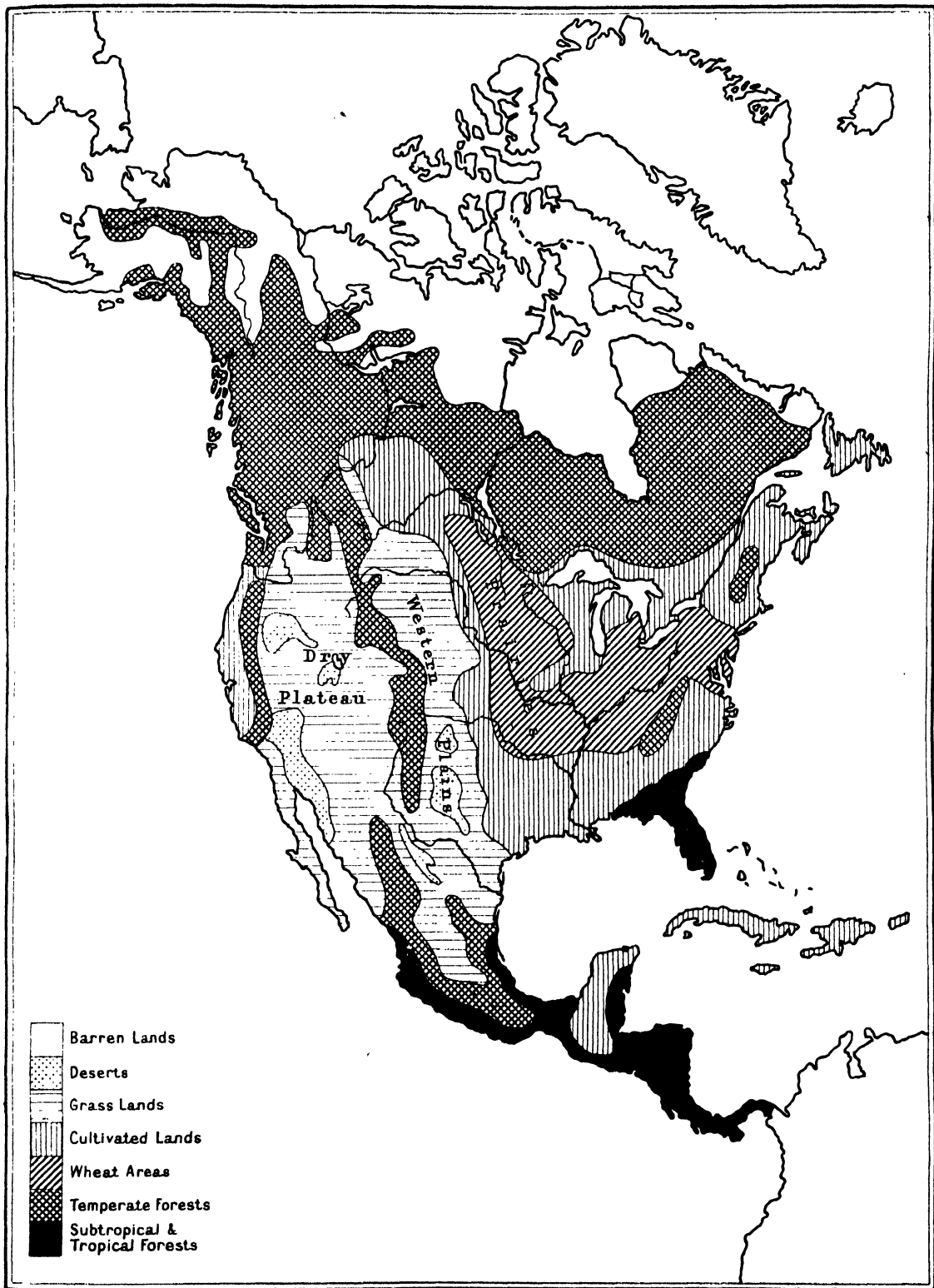
Notice on Map 61 that the southern boundary of the Tundras is in a much lower latitude on the east, where it borders Hudson Bay, than in the west. This is entirely due to climatic conditions caused by ocean currents.

The Forest Belt.

This reaches farther south in the east than in the west, stretching in the former from Hudson Bay to the Great Lakes, and in some places south of them. The northern forests bordering the country are not valuable for timber, but they form the home of numerous fur-bearing animals, the skins of which find a ready market in Europe. The Hudson Bay Company has established numerous stations in this area, from which trappers work their way into the interior. The chief fur-bearing animals of North America are the *bear*, *marten*, *sable*, *silver fox*, *beaver*, *mink*, and *skunk*.

The more southern forests, particularly in the basin of the St. Lawrence, are useful for their timber. In the winter, when the frozen snow makes possible good temporary roads, the trees are cut down and hauled to the nearest ice-bound river to await the spring floods caused by the melting snows. Those rivers draining from the north to the St. Lawrence are obstructed by waterfalls, and these are utilised to turn the saw-mills. Ottawa, on the Ottawa River, is the centre of the lumber industry, and Montreal, in addition to being a lumber port, has leather industries dependent on the bark obtained from the forests. The chief trees found here are *spruce*, *pine*, *birch*, *maple*, and *oak*.

The Lake Peninsula, the oldest part of Canada, was once forested. In the cleared lands the original settlers grew



NORTH AMERICA—VEGETATION.

wheat, but the production of that grain on the more western prairies caused them to adopt mixed farming. To-day their chief products are *fruits* and *cheese*.

The Prairies.

Stretching from Lake Winnipeg southward to the Gulf of Mexico, and roughly bounded by the 100° meridian in the west, are the Prairies. They are divided into three sections—the northern part, having greater extremes and a drier climate, grows *wheat*; the centre, having less extremes and a plentiful water supply, grows *maize*; the south, where it is much warmer and damper, grows *cotton* and *tobacco*, with *rice* in the flooded areas of the river mouth.

The Wheat Belt.

This stretches from Lake Winnipeg southward to Chicago, the richest lands being in the valley of the Red River of the North. The United States grows such large quantities that it is not only able to supply its own vast population but exports a large amount to the densely populated districts of Europe.

Canada also grows large quantities of wheat, and with the future development of railways these wheat lands can be largely extended. The grain will grow much farther west in Canada than in the United States, because although the west has little rain yet this falls chiefly in the spring when it is required by the growing wheat.

Winnipeg is the most important centre of the Canadian wheat lands, and from *Port Arthur*, on Lake Superior, much of the wheat is shipped. *Duluth*, *Milwaukee*, *Chicago*, and *Toledo* are the Lake ports of the United States engaged in the exportation of wheat. *Milwaukee* has a brewing industry dependent upon the barley grown in the area.

Maize Areas.

Maize requires a damper and more equable climate than wheat, hence this product is grown in the river valleys of the Mississippi Basin between Chicago and St. Louis. North America is the largest maize-producing region in the world, and much is used in fattening cattle and pigs. The former are sent alive to the ports of Europe, and the latter are used

in the tinned meat industries of Chicago and other towns in this area.

Cotton and Tobacco Areas.

Cotton grows in *Texas*, west of the Lower Mississippi, and is exported from *Galveston*. That produced in the *Valley of the Mississippi* is exported at *New Orleans*, and that of *Alabama*, east of the river, is exported at *Mobile*. The higher slopes of the plains towards the Eastern Highlands are tobacco lands, especially in the *States of Kentucky* and *Louisville*. *Sugar* and *rice* are grown in the lower lands of the river delta.

Grass Lands.

West of the 100° W. longitude meridian the land rises gradually to the base of the Rockies, and these regions, far removed from the sea, are too dry for agriculture, and provide pasture for numerous cattle. In Canada, where the rain falls in spring and the melting snows allow agriculture to be carried much farther west, these cattle-farming areas are not so large, although the State of *Alberta*, in the basin of the Southern Saskatchewan, is an important stock-farming country. Farther south, in the basin of the Upper Missouri, Yellowstone, Platte, Kansas, and other rivers, are much larger areas of grassy plains, over which roam herds of cattle in a semi-wild condition. These cattle are slaughtered and sent to the markets of Europe. *Kansas* and *Omaha* are the chief centres of this meat industry in the United States. The tuft grass which grows on these prairies is more suited to cattle than sheep. The latter graze it too closely, and prevent it growing again, hence in some of the States laws exist to prevent the keeping of sheep in certain districts.

The Eastern Highlands and Atlantic Coastal Plain consists of two distinct vegetation regions. North of Chesapeake Bay the country is forested. South of that opening the land forms an eastern continuation of the cotton and tobacco regions of the southern central plain. Florida, having a heavy rainfall, is well timbered, and produces quantities of *fruit*, especially *oranges*.

The forest areas consist largely of stony glacial soil, which will not repay clearing. *Nova Scotia* and *New Brunswick* are both engaged in the lumber industry,



NORTH AMERICA—VEGETABLE AND ANIMAL PRODUCTS.

M—COM, GEOG.

as are also the neighbouring islands, and this forest area is continued into Newfoundland, which has a wood-pulp industry. Nova Scotia is noted for *apples*. Fredericton is the centre of the lumber industry in New Brunswick.

Sea island cotton, having long fibres, is a product of the southern coastal plain, owing to the warm, damp climate.

The demand for unskilled labour and the trying climate of this region led to the introduction of Negro slaves from Africa to work on the cotton and tobacco plantations. This slave trade eventually led to the Civil War between the Northern and Southern States.

The juniper tree is the chief tree of the forests of Florida. *Fruits*, especially *oranges* and *pineapples*, are plentiful. In the south is an impenetrable marsh, known as the *Everglades*, covered for the most part with tall saw-grass, but in the west consisting of mangrove swamps.

Central America.—Mexico and Central America exhibit many vegetation regions dependent upon elevation. The low coastal plains with their damp, hot climate are forested with *mahogany* and other tropical trees, and grow *cacao*, *sugar*, *rice*, and *cotton*. The lower slopes of the plateau produce *coffee*, *maize*, and *tobacco*, succeeded in the more elevated slopes by *wheat* and *pasture land*. As the interior plateaux are dry, especially in the north, they consist of poor grass lands and deserts.

The eastern lands get a greater rainfall than the west, and hence are more densely forested and fringed with malarial swamps. They are therefore not so well suited for cultivation as the drier lands of the south.

Henequen (hemp) is an important product of Yucatan. *Cotton* is grown in the neighbourhood of Vera Cruz, *rubber* in the Isthmus of Tehuantepec, *tobacco* in Honduras and *indigo* in San Salvador.

The West Indies.—These, like Central America, show many types of vegetation dependent upon elevation. The windward slopes of the mountains are thickly forested with *mahogany*, *cedar*, *ebony*, and other ornamental woods. *Sugar* is an important product, but the growth of the sugar-beet in Europe has caused the export to decrease.

Tobacco, *coffee*, *cacao*, *spices*, and *fruits*, such as bananas and pineapples, are plentiful.

The West Indies have a rich volcanic soil, which combined with the great heat and moisture render the land very fertile.

Cuba grows the most tobacco, and its port of Havana, exports *cigars*. Jamaica contains the chief sugar plantations, and grows in addition large quantities of *bananas*, *cocoa*, and *spices* (especially ginger). Other products obtained from these islands are *cocoanuts* from the palms bordering the coast, *oranges*, *limes*, *cinchona*, *cassava* (for tapioca), and *arrowroot*.

Fisheries.

Notice that the continental shelf bordering the east coast widens out towards the north and forms a large area surrounding Newfoundland. This area is full of sandbanks, upon which fish breed in large numbers. These feed upon the slime brought down by the cold Labrador Current. *Cod* and *herring* are caught in large quantities off the Newfoundland banks, and fishing is the chief occupation of the people in the island. It is also an important industry in Nova Scotia and the New England States. The Labrador Current brings in addition to the slime huge ice-floes to the coast of Newfoundland. Upon these floes the *seals* rear their young, and in spring are easily caught. Though not the fur-coated species these yield valuable oil.

Farther south, at the mouths of the Susquehanna and Potomac, the alluvial mud forms a breeding ground for *oysters*. Notice that the Delaware Peninsula shelters Chesapeake Bay from the full force of the Atlantic. Baltimore is the chief centre of this oyster industry.

The rich *salmon* fisheries of the north-western rivers have already been mentioned.

EXERCISES.

1. Name the chief forest areas of North America, and show how far their location is determined by climatic conditions.
2. Where is wheat grown in North America? Upon what climatic conditions does it depend? Show why the future railway development of Canada will increase the export.

3. Name the chief temperate and tropical fruit-producing regions in North America.
4. Explain clearly why the South-West Highland system consists of poor grass or desert land while the northern part of the same system can be cultivated.
5. Compare the barren lands of Canada with the Tundra of Asia. Show roughly on a sketch map its southern boundary, and give reasons for the course it takes.
6. Describe the chief products of the West Indies. Upon what climatic and other natural conditions do these depend?
7. Name the chief cotton and tobacco producing regions of America. Explain why there are so many Negro inhabitants in this region.

Minerals.

North America has richer deposits of mineral wealth than any other continent. These consist of large supplies of *gold* and *silver* and extensive deposits of *coal* and *iron*, which together with other industrial minerals have made the United States one of the first manufacturing countries of the world.

Industrial Minerals.

Compare Mineral Map 63 with the Surface and you will notice that, corresponding with the three mountain systems of the Western, Eastern, and Laurentian Mountains, are rich deposits of *coal* and *iron*.

In the Eastern Highlands *coal* is found in Nova Scotia and on Cape Breton Island, near to navigable water and in contact with limestone and valuable supplies of pure iron-ore. Farther south, *coal* and *iron* are found along the western slopes of the Appalachian Mountains, stretching from *Harrisburg* in the north to *Birmingham* in the south. The richest deposits in this large area are in the basin of the Ohio, where *Pittsburgh* is the centre of one of the busiest manufacturing regions of the world. This coal is found in thicker seams, nearer the surface, and is easier to work than that found in the British Isles. Coal is found in the Western Mountain system in the island of Vancouver, where it is used for railways and shipping, in the centre of British Columbia, and at the eastern foot of

the Rockies, where the main Canadian Pacific Railway leaves the mountains for the plain. British Columbia has also rich deposits of iron-ore.

In the Laurentian system much *iron-ore* is found around the Great Lakes, although more, which is at present undeveloped, probably exists farther north. Large deposits are found on the Canadian side in Ontario and Quebec, and along the shores of Lake Superior and Michigan. The latter supplies are near to a central coalfield which lies between Chicago and St. Louis. *Coal* of a poor quality, used on the railways, is found in Mexico, and rich deposits of iron in the Sierra Madre.

Valuable supplies of *natural oil* and *gas*, both now being extensively used in manufactures, are found in the Eastern and Laurentian systems.

Natural gas is plentiful at *Pittsburgh*, and oil is found near Lake Erie and conveyed by pipes to the Allegheny coalfields and to the Atlantic coast to be shipped to Europe. Oil is also abundant in the Lake Peninsula.

Copper.—North America produces more copper than any other continent. In the Laurentian system copper is found in large quantities, both on the Canadian and southern shores of Lake Superior. Rich deposits are also found in the Rockies, and smaller quantities are mined along the northern shores of Lake Huron, and also near Sudbury on the main Canadian railway. Pure copper is also found in Mexico.

Gold and *silver* are plentiful in the Western Highland system, and the continent of North America ranks first in the production of these precious metals. The whole region from Yukon in the far north to Mexico in the south is rich in mineral wealth. The chief gold districts are—

1. The Klondike fields in the Yukon Basin.
2. The Fraser and Columbia Basins of British Columbia.
3. California.
4. The Plateau of Idaho.
5. Montana and Dakota on the eastern side of the Rockies.
6. The Plateaux of Colorado and Arizona.

Gold is also found in Nova Scotia, along the northern shores of Lake Superior, and in Mexico.

Silver is obtained in the Fraser and Columbia river basins and also near Lake Superior, but the richest deposits are in the Southern Rockies of the United States and in Mexico. Valuable seams are found in Honduras.

Lead is found largely in the silver-producing areas of the United States. Colorado has the largest production of lead.

Sulphur is obtained from the volcanic districts of Mexico.

Asphalt is found in the south-west of Trinidad (one of the smaller islands of the West Indies lying near the coast of South America). This island possesses a large asphalt lake, from which pitch has been obtained since the early discovery of these islands.

Gypsum and other minerals found in Eastern Canada are used as manures.

Asbestos is found in Quebec.

Manufactures.

There is a striking contrast between the manufactures of Canada and those of the United States. In the former, large parts are at present thinly peopled, and the full development of its vegetable resources requires an increased population. Hence the manufactures are few, and consist either in preparing the raw products for export or in making the necessary agricultural and other implements required on the land. In the United States there is a denser population, and many of the people are engaged in manufactures. The rich mineral deposits, the supply of raw material, the easy rail and water communication, the temperate climate, and the good water power, are all causes enabling this country to compete successfully in the same markets as the chief manufacturing countries of Europe.

Of the manufactures, those in *iron* rank first, and include, in addition to the ordinary iron and steel goods, the making of locomotives and railway plant, agricultural implements, and road carriages and wagons. *Cotton* manufactures rank second, and are followed by *woollen* goods, *prepared meat products*, *paper*, *leather*, *boots and shoes*, and *furniture*.

In Central America and the West Indies manufactures are few, and are connected

chiefly with the preparation of food products grown in the interior.

Iron and Steel Goods.

These are located on the great coalfields. The rich supplies of coal, petroleum, and natural gas in Pennsylvania caused the centre of this important industry to be situated at *Pittsburgh*, and much of the ore of the Lake Region is brought here for smelting.

Pittsburgh has the largest iron, steel, and glass manufactures in the United States.

Birmingham and *Nashville*, on the more southern coalfield, have smelting works and cast-iron manufactures.

Chicago, *Cincinnati*, *Indianapolis*, *Detroit*, and *Omaha*, all make railway locomotives, and the two first named manufacture machinery and agricultural implements.

Philadelphia has a shipbuilding and locomotive industry.

In the New England States there are important tool and cutlery manufactures, and *Albany* has iron works, while *Worcester*, *Hartford*, and *Springfield* manufacture machinery for the cotton factories.

The existence of coal and iron on the west coast near *Seattle* is creating an iron industry on the Pacific coast.

Sydney, in Cape Breton Island, has important smelting works for local supplies and the ore from Newfoundland.

Montreal manufactures locomotives and agricultural implements.

Denver and *Pueblo*, at the eastern base of the Rockies, are smelting and metal refining centres.

Cotton and Other Textiles.

The cotton manufactures of the United States were for a long period carried on only in the New England States, but manufacturing towns are now important in the southern cotton-growing States.

In the New England States of the north-east the damp climate and large amount of available water-power caused this industry to flourish. *Manchester*, *Lowell*, *Providence* and *Fall River* are important centres.

Raleigh, *Augusta*, and *Montgomery* all on the Fall Line, have cotton works, while *Galveston* manufactures oil cake.



NORTH AMERICA—MINERALS AND IRON AND STEEL MANUFACTURES.

Woollen Goods.

These are manufactured on the Eastern Pennsylvanian coalfield and in the New England States. *Boston* and *Philadelphia* are the most important towns.

Clothing.

New York leads in this industry, but *Boston*, *Utica*, *Syracuse*, and *Rochester* in the north-east of the United States, *Philadelphia* and *Baltimore* on the Atlantic coast, and *Cincinnati* in the Plain, also have important ready-made clothing industries.

Manufactures connected with Animal Products.

The numbers of cattle reared in the grassy plains of the west, and also in the maize area, provide material for a large *leather* and *boot* and *shoe* industry.

Quebec uses the bark of forest trees in her leather factories.

In the United States *Worcester* and *Rochester* make large quantities of boots and shoes, while *Newark* (a suburb of New York), *Philadelphia*, *Chicago*, *Portland*, *Boston*, and *Allegheny* have important leather industries.

The slaughtering of cattle and preparation of them for the markets of the world is an important industry in *Omaha* and *Kansas City*. *Chicago* and *Cincinnati* in the maize area have, in addition to cattle export, large *canned meat factories*, *bacon* and *ham curing* industries, and large manufactures of *lard*.

Dairy cattle are of the greatest importance in the Lake Peninsula, and create a large *cheese* industry in that region.

The *salmon* caught in the rivers flowing to the Pacific give rise to a *tinned fish* industry on the Pacific coast, with *Portland* as the chief town engaged.

Timber Industries.

Saw-mills are important in the lumber area, the centre being at *Ottawa*. Wood pulp for *paper manufacture* is obtained from the Canadian and Newfoundland forests, and paper is made at *Boston* and *Portland* in the north-east of the United States.

The manufacture of furniture, dependent upon the proximity of the forests, is important at *Chicago* and *Great Rapids*, as well as in the towns of Eastern Canada.

Industries connected with Vegetable Products.

Minneapolis, situated at the Falls of St. Anthony, uses the water-power of the Mississippi for driving its *flour-mills*, which are the largest in the United States. *St. Louis* and *Rochester* also have important mills.

Milwaukee has *breweries* dependent on the barley grown in its neighbourhood.

Baltimore on the east coast, and *Portland* in the west, together with the Pacific towns of British Columbia, possess important *tinned fruit* industries.

The growth of *tobacco* on the Atlantic and Central Plains is responsible for a tobacco manufacture, in which *Richmond* and *Baltimore* are the two most important centres.

The production of tobacco in the West Indies creates a *cigar* industry at *Havana*, in the island of Cuba.

EXERCISES.

1. Explain clearly why the United States, Germany, and the United Kingdom are the chief manufacturing nations of the world. What special natural advantages possessed by the United States enable her to compete with the two other nations?
2. Draw a map of North America showing the position of the chief coalfields, and name the manufactures carried on in each.
3. What power can the United States use other than that of coal? State in each case the locality where used.
4. Draw a comparison between the Vegetation and Manufactures Maps, and name the chief manufactures depending upon the vegetable and animal products.
5. Name the chief areas in the United States noted for precious minerals and the towns whose importance depends on this mineral wealth.
6. Draw a contrast between the manufactures of the United States and Canada. Give reasons for any differences.
7. Name the chief cotton manufacturing areas of North America. What effect has the growth of this manufacture upon the Lancashire cotton mills?
8. What is the Fall Line? Name the chief towns on it, and in each case give their importance.
9. What industries in Canada are dependent upon: (1) the forest, (2) the grain areas, (3) the fruit-producing regions?



NORTH AMERICA—MANUFACTURES (EXCLUDING THOSE OF IRON AND STEEL).

Routes.

The rapid development of the United States during the last two centuries has been made possible by the great network of railways and waterways, which enable the products of the Central Plain and the west to be brought to the trade centres on the Atlantic, from which ocean liners cross to the markets of Western Europe. Great iron roads now connect the Atlantic to the Pacific.

Canada has similar railways, and the future development of the rich food supplies of her interior plains is dependent upon the construction of railways, enabling these products to be brought to the coast for shipment across the Atlantic.

The early British emigrants settled along the Atlantic Coastal Plain, being shut off from the interior by the Appalachian Barrier. When railways were taken across the latter, the Central Plain, with its rich mineral, vegetable, and animal wealth, rapidly developed.

Trace the following routes, and notice where they make use of natural features.

Canadian Railways.

From *Quebec* and *Montreal*, on the estuary of the St. Lawrence, a route follows the valley of the river Ottawa to the town of *Ottawa*, the capital and centre of the lumber industry of Canada, and to *Sudbury*, in a rich mining district, and then runs to *Port Arthur*, a grain port on the northern shore of Lake Superior. From thence it crosses to *Winnipeg*, the centre of the Canadian wheat lands, and passes through *Regina* and *Calgary* in the western plains to the base of the Rockies. It crosses the latter by means of the *Kicking Horse Pass*, and follows the *Thompson River* across the plateau, eventually reaching the coast at *Vancouver*.

Notice on the map a more northern route running to *Edmonton*, and providing a means of exit for the more northern wheat lands. With the object of developing the rich plains railways are now in course of construction: (1) from *Quebec* to *Winnipeg*, north of the existing line; (2) from *Edmonton* to *Prince Rupert*, at the mouth of the river Skeena on the Pacific coast; (3) from *Regina* and

the wheat lands to the *Hudson Bay Ports*.

Montreal is connected by rail to *Halifax* in Nova Scotia and *St. John* in New Brunswick. These routes are useful in winter, when, owing to the St. Lawrence estuary being frozen, ocean liners land their passengers at the ice-free ports of Halifax and St. John.

Between Lakes Huron, Erie, and Ontario lies the *Lake Peninsula*. Trace the line of railway which runs through this peninsula from Montreal to tap its rich vegetable and mineral wealth.

In the far north-west is a line of railway from *Skagway* on the west coast to *Dawson* in the centre of the Klondike goldfields of the Yukon Basin.

Railways of the United States.

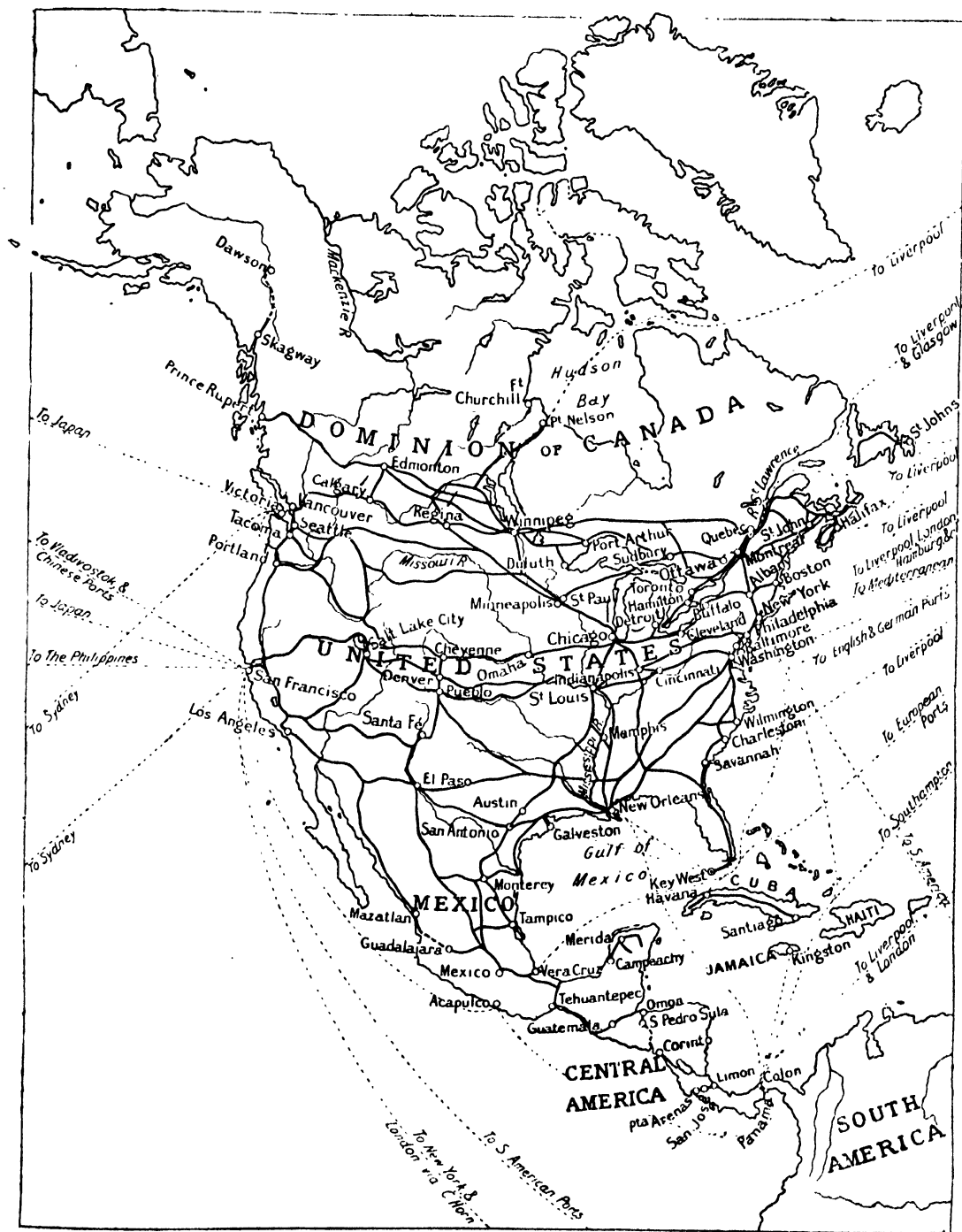
1. Routes across the Appalachians.

The important trans-continental lines of railway from the Atlantic to the Pacific coast meet a difficult obstacle in these mountains, and can only cross them by using some natural feature.

Fig. 28 shows the valley of the *Hudson* and its tributary the *Mohawk*. The numerous lines using this natural gateway into the interior have caused *New York* to be the second largest city in the world. Trace the route from *New York* to *Albany* and its continuation *via* the *Richelieu River* to *Montreal*. Notice also a line from *Boston* to *Albany*, which has to tunnel the mountains of New England. From the latter town the chief route follows the Mohawk to *Buffalo* at the eastern end of *Lake Erie*, and from thence to *Chicago*, the route centre and most important town of the plain, situated at the southern end of *Lake Michigan*.

From the ports of *Philadelphia* and *Baltimore* trace the two lines using the valleys of the *Susquehanna* and *Potomac Rivers*. That from Philadelphia crosses to *Pittsburgh*, the centre of a rich mining and manufacturing region, and from thence is linked to *Chicago*. That from *Baltimore* crosses to *Cincinnati* in the Ohio valley, and from thence to *St. Louis*, the second route centre of the plains.

The remaining lines follow the lower plateau or coastal plains, and turn round the southern end of the Appalachians to reach the Central Plain.



Scale, 789 miles to inch.

ROUTE MAP OF NORTH AMERICA.

2. Routes from the Central Plain to the West Coast.

From *Chicago* trace a route passing through *St. Paul* and *Minneapolis*, and following the *Yellowstone* valley to *Helena* at the base of the Rockies, then crossing the plateau in the valleys of the southern tributaries of the *Columbia River* to reach the coast at *Portland* on the estuary of that river. Also notice a more northerly branch running to *Tacoma* and *Seattle* on *Puget Sound*.

Trace a second route from *Chicago* passing through *Omaha* to *Cheyenne* at the foot of the Rockies, thence *via Salt Lake City* and the river *Humboldt* to *San Francisco*.

A third route from *Chicago* to *St. Louis* passes through *Kansas City* to *Pueblo* at the base of the Rockies, thence to *Salt Lake City*, and follows the previous route to *San Francisco*.

The route from *St. Louis* to the more southern town of *Los Angeles* follows the previous route to *Pueblo*, turning south to *Santa Fé*, and is carried across the Colorado Plateau to the coast.

Los Angeles is joined to the more southern lines of the United States and to the Mexican railways by a route passing through *El Paso* on the *Rio Grande*.

Routes of Mexico, Central America, and the West Indies.

From *El Paso* a route runs through the Mexican capital to the important port of *Vera Cruz* on the east coast. A more easterly route connected with the United States port of *Galveston* runs through *Monterey* to join the previous route north of the capital of Mexico. Branches, both from *Monterey* and *S. Luis Potosí*, connect it to the important port of *Tampico* on the coast.

The chief railways south of this are those which cross from the Atlantic to the Pacific: (1) *via the Isthmus of Tehuantepec*, (2) across the *Isthmus of Nicaragua*, and (3) across the *Isthmus of Panama* from *Colon* to *Panama*.

In the West Indies trace a route running through *Cuba* from *Havana* to *Santiago*, and a second route through *Jamaica* passing through *Kingston*, the capital.

Canals and Waterways.

The St. Lawrence.

By means of the *Sault Ste. Marie* or *Soo Canal* between Superior and Huron, and the *Welland Canal* between Erie and Ontario, there is through communication for lake steamers from Lake Superior to the estuary of the St. Lawrence, and important ports have sprung up both on the northern, or Canadian, and on the southern shores (see Route Towns). The Mississippi is connected with this great waterway by a canal from *Chicago* to the *Illinois* tributary, and by another canal from *Milwaukee* to the *Wisconsin* tributary. Lake Erie is joined to New York *via* the *Erie Canal* and the Hudson River.

The Mississippi.

This river with its navigable tributaries forms a great artery for trade. The *Ohio* is navigable to *Pittsburgh* and the *Missouri* to the foot of the Rockies, while the main stream can be navigated from the *Falls of St. Anthony* at *Minneapolis* to its mouth at *New Orleans*. This great waterway forms a rival to the railways of the Central Plain, for although slower as a means of communication, goods can be sent by water at one-third of the cost of rail transit.

EXERCISES.

1. Show how railway routes make use of natural features in crossing the Appalachian Mountains.
2. Describe the trans-continental railway from Montreal to Vancouver and the physical features passed through on a journey between these ports.
3. Name the chief artificial waterways necessary in order to make possible a through navigation between Port Arthur and Montreal.
4. Name the canal systems which connect the St. Lawrence to the Mississippi and the Hudson.
5. Show how physical features have made Buffalo, Chicago, and Montreal important.
6. Describe a railway journey from New York to San Francisco.
7. Describe the exact position of Montreal. Show the importance of the railway connection between it and New York, Portland, Halifax, and St. John.

8. Name the chief ports of the Atlantic coast trading with Europe, and arrange them in the order of their commercial importance, giving reasons for your answer.
9. Nearly all the trade of Western North America is confined to three inlets. Name these and the chief ports on each. Show what conditions make these important.
10. Name the chief seaports which trade with Colon and Panama. Show how the two latter will increase in importance with the opening of the Canal. Name two towns in the Old World having a similar importance.

Steamship Communication.

Find the chief steamship routes from the eastern ports across the Atlantic to the western shores of Europe, and also the inter-continental trade between one port and another. On the west, notice the routes from *San Francisco* and *Vancouver* to the opposite shores of Asia, and also to Australasia. The routes between *New York* and *Colon*, and between *San Francisco* and *Panama*, will increase in importance with the opening of the Panama Canal.

Route Towns and River Ports.

The positions of both the great seaports and the chief centres of population have been determined largely by the surface features. In the mountainous regions they are situated at the entrance to some natural gateway. On the Plain they stand where the confluence of waterways has caused a convergence of both waterways and land routes. The natural features which have determined the position of such ports as *New York*, *San Francisco*, and *Montreal* will be dealt with under the heading of Seaports. The other route towns are either important centres in the Plain, e.g., *Chicago* and *St. Louis*, or towns guarding routes across the mountains, e.g., *Helena*.

Chicago is the most important town of the Plain, and has a population three times that of *Manchester*. It is the largest inland port in the world, and being situated at the southern end of *Lake Michigan* it not only has a large trade through the Great Lakes, but its canal communication with the *Mississippi* gives it a through waterway to the Gulf of Mexico.

The railway routes of the east and the west converge on it to pass round *Lake Michigan*. Hence it has become one of the largest trade centres of the world, and being situated near to rich deposits of iron-ore it has important manufactures.

St. Louis, the second largest town of the Plain, is situated at the confluence of the *Missouri* and *Mississippi*, almost in the exact centre of the United States. Railways and waterways both converge on it, and these have made it important.

Buffalo, at the eastern end of *Lake Erie*, is on the canal joining that lake to *New York*, and not many miles away from the *Niagara Falls*, from which it obtains water-power. It also stands on the northern edge of the rich *Pennsylvanian* coalfield.

Duluth, *Milwaukee*, *Detroit*, and *Cleveland* are also ports on the southern or United States shores of the Lakes, while *Port Arthur*, *Toronto*, *Hamilton*, and *Kingston* are important Canadian ports on the northern side. Of these, *Duluth* and *Port Arthur* export the grain from the wheat lands of the interior. *Detroit* has a through railway communication with the Canadian lines through the *Lake Peninsula*. *Milwaukee* has a canal connection with the *Mississippi*. *Cleveland* is an important mineral port trading with the *Pittsburgh* coalfield. *Toronto*, *Hamilton*, and *Kingston* export the produce of the *Lake Peninsula*.

Albany lies at the confluence of the *Hudson-Mohawk*. Fig. 28 shows that it is situated at the meeting point of routes from *New York*, *Boston*, *Montreal*, and *Buffalo*.

Ottawa, on the river of the same name, is an important railway centre in the lumber district of Canada. It is also the political capital of the Dominion.

Winnipeg, in the centre of the wheat belt, and *Calgary* and *Edmonton* in the western plains, are important route towns of the Canadian railway system, while *Cincinnati*, *Omaha*, and *Kansas City* have a similar importance in the central plain of the United States.

Helena, *Cheyenne*, *Pueblo*, *Santa Fé*, and *Denver* are situated along the eastern foot of the *Rockies*, where the railways leave the Plain to cut their way across the *Western Mountain* system, while *Salt Lake City* is an important route

centre in the Great Basin, from which the railway follows the Humboldt River, and reaches the coast at San Francisco.

Seaports.

1. On the Atlantic Coast.

New York is the most important town of the New World and second only in population to London. Situated at the estuary of the Hudson River, on *Manhattan Island*, it is the eastern terminus of the chief railway systems of the United States, and therefore does a far larger trade than any other port on the eastern coast. Its rapidly increasing population has overflowed into the neighbouring suburbs of *Brooklyn*, *New Jersey*, and *Long Island City*.

Boston is situated on a good harbour on the New England coast. In addition to its trade as a seaport it has important manufactures, and is the chief university centre of the United States.

Gloucester, near Boston, is the chief fishing port in the United States.

Philadelphia, at the mouth of the Delaware, is the terminus of a railway, which, using the Susquehanna valley, crosses to Pennsylvania, thus providing an outlet for the rich mineral wealth of that region.

Baltimore, on Chesapeake Bay, is not so important. In addition to its export trade it has manufactures of tobacco. There are also valuable oyster fisheries.

Norfolk, at the entrance to Chesapeake Bay, has an important fishing trade, and is specially noted for its oysters.

Charleston, on an artificial harbour, *Savannah*, on the estuary of the same name, and *Wilmington*, on the North Carolina coast, are cotton ports in the south.

Montreal, at the confluence of the Ottawa and the St. Lawrence, lies at the limit of ocean navigation. The great Canadian railways and internal waterways converge here, and hence it is the most important port of the Dominion. Its great drawback is the winter climate, which makes it necessary for ocean traffic to be diverted to the more southern harbours at Halifax and St. John.

Quebec is rapidly decreasing in importance as a port since the deepening of the river to Montreal.

Halifax has an excellent harbour, well protected and accessible for the largest

steamers at all times of the year. It has railway communication with Montreal, and exports the rich mineral wealth of Nova Scotia.

St. John, on the Bay of Fundy, has an importance similar to that of Halifax, but does not possess such a good harbour.

Portland, on the New England coast, has railway communication with the St. Lawrence, and rivals Halifax and St. John as a winter port for Canadian traffic.

St. John's is the chief port and capital of Newfoundland. It has a deep harbour, and is the chief fishing station of the island.

2. On the Pacific Coast.

San Francisco, on a magnificent harbour, is the most important outlet of the west. Fig. 25 shows its position at the estuary of the Sacramento. It not only exports the produce of the valleys behind it and the mineral wealth of the interior, but the convergence of the great railway systems of the United States gives it additional importance. A large trade is carried on by various lines of steamers, especially those trading with the opposite shores of China and Japan.

Portland, at the estuary of the Columbia, controls the wheat and timber trade of the interior, and is the terminus of a trans-continental railway.

Notice between Vancouver Island and the mainland there is a sheltered channel on which are situated *Vancouver* and *New Westminster* in Canadian territory, *Tacoma* and *Seattle* on the more southern arm in the United States boundary known as Puget Sound, and *Esquimalt*, the port of *Victoria*, on Vancouver Island. The town of Vancouver is situated on a fine natural harbour, and is the terminus of the Canadian Pacific Railway. New Westminster is situated at the mouth of the Fraser River. Esquimalt has one of the finest harbours in the world, and much of the Canadian trade of the west converges on this port.

Prince Rupert, at the mouth of the Skeena River, will probably increase in importance with the opening of the new trans-continental railways from Quebec.

Skagway is the Canadian port for the Yukon Basin and the Klondike goldfields.

San Diego, in the south, is the port for *Los*



NORTH AMERICA—POLITICAL DIVISIONS.

Angeles, the fruit market of Southern California.

3. *On the Gulf of Mexico.*

New Orleans stands on the chief mouth of the Mississippi, and exports the products of the southern part of that river basin. The river mouth has been artificially deepened to accommodate ocean vessels.

Mobile, on a fine natural harbour, exports the products of the south-eastern states.

Galveston is the cattle and cotton port of Texas and the lands west of the Mississippi Delta.

4. *Ports of Mexico, Central America, and the West Indies.*

Vera Cruz and *Tampico* on the east, and *Acapulco* and *Mazatlan* on the west, are the chief seaports of Mexico.

In Central America the only important ports are *Colon* at the eastern and *Panama* at the western extremity of the Panama Canal.

In the West Indies *Havana* is the chief port and capital of *Cuba*, exporting the products of the interior, and *Santiago* is the port of its eastern plains.

Port au Prince is the chief port of the island of *Haiti*.

Kingston is the chief port and capital of *Jamaica*.

San Juan is the port of *Puerto Rico*.

Commerce.

There is a distinct contrast between the trade of Canada and that of the United States. The greater part of the former country consists of recently developed land, which yields food products for export to the chief markets of the world. In the latter a denser population is engaged, not only in agricultural pursuits, but in utilising its mineral products in the manufacture of goods from its own raw products. Hence, except for tropical products, the United States is self-supporting, and has, in addition to its foreign commerce, a large internal trade using the network of railways and the great waterways of the interior.

The production by the United States of most of the commodities it needs, means that the foreign commerce is small in comparison with the home trade. A great

change has taken place in recent years in the nature of the exports. Formerly they were mainly agricultural products; but abundant supplies of raw material and a great development of manufactures has led to a large export of manufactured goods. The United States is now a formidable competitor with the old industrial nations.

Canadian commerce is greatly aided by the possession of a magnificent inland waterway system and an important set of trans-continental railway lines.

A large trade is carried on between the United States and Canada, and the railway connections between the two countries are numerous and important.

America is separated from the western shore of Europe by the Atlantic Ocean, and liners are now capable of crossing it in a few days. These bring from Canada to our shores the *wood-pulp manufactures* of the lumber area, the *wheat* from the grain area, the *cattle, hides, and skins* from the grass lands, the *cheese and butter* from the Lake Peninsula, the *fish* (chiefly cod) from the fishing banks, the *salmon* from the rivers, and the *fruits* of Ontario and British Columbia.

The United States exports its excess products to our own and neighbouring countries. Of these exports *raw cotton* ranks first, and is succeeded by *meat, dairy produce, cereals, wood and wood manufactures, animals, and tobacco*. The chief manufactured exports are *iron and steel goods, copper goods, cotton goods, and leather goods*.

The west coast of America is separated from China and Japan by the Pacific Ocean, and with the rapid advance of these two countries within the last century there has sprung up an important trade between the ports on either side of the Pacific.

Mexico and Central America trade chiefly with the United States, exchanging *silver, copper, gold, lead, coffee, hides, and tobacco* for the manufactured articles of the latter country.

Political instability prevents any great advance in Mexican industries and commerce.

The Mexican railways are linked up with those of the United States.

The commerce of much of Central America is hindered by the lack of good means of transport. The resources, though great, are consequently little developed.

United States Commerce.*New England States.*

This area has many important resources, particularly in its *forests, fishing industry, and its manufactures*. The wealth of the forest area was recognised as far back as the early Puritan settlement, and still gives rise to an important lumbering industry, especially in the state of Maine. There is a large export of *timber* from *Portland*. *Paper* is made from *wood pulp* at a number of towns, the chief among which is *Augusta*. Fishing, like lumbering, is an old-established industry, and *cod, mackerel, and halibut* are caught in immense quantities. The most important fishing centres are *Gloucester* and *Boston*, and these towns export fish to Europe.

The great wealth of the United States in raw material, metals, and fuel must lead to a great development of the already important manufacturing industry of the New England States. *Manufactured goods*, principally of cotton, iron, and leather, are being exported in yearly increasing quantities.

Other Atlantic States.

In Pennsylvania there is immense wealth in *coal, iron, and oil*, and this has led to the establishment of manufactures. A very large part of the *petroleum* of the world is exported from Pennsylvania and the neighbouring states. The Virginias are noted for their tobacco, and export large quantities. The South Atlantic States are purely agricultural and export *cotton, fruits, sugar, and rice*. Cotton is the chief crop, and formerly formed the bulk of the world's produce. "*Sea Island*" cotton is still in great demand.

Pacific States.

In the north *lumbering* and *mining* are the chief occupations, though *wheat* is an important product near Puget Sound. *Seattle* and *Tacoma* export *timber*, but there is a very large demand in the mines for the timber of the western forests. The mineral wealth of this area is enormous, and was the first attraction to early settlers. *Gold, silver, cotton, lead, and mercury* are exported.

Irrigation, especially in California, is leading to a very large *fruit* production, and the export of *fruits, fresh and tinned, and wine* is becoming very important.

Central Area.

In the extreme north *wheat* is the staple product, and forms the chief export. To the south of the wheat belt *maize* is the great crop, and has led to the *hog raising* and *pork packing industries* for which the United States are so noted. The western part of the central area is the great *cattle ranching* division which supplies a very large export of *meat*, and furnishes the *hides* for the leather industry of the States.

Chief Exports.

Cotton (raw)	£112,000,000
Iron and steel	61,000,000
Grain	43,000,000
Meat	31,000,000
Copper	20,000,000
Mineral oils	28,000,000
Timber	23,000,000

Chief Imports.

Coffee	£24,000,000
Hides	23,000,000
Sugar	21,000,000
Rubber	10,000,000
Silk (raw)	17,000,000
Fibres (vegetable)	10,000,000
Tin	11,000,000

The chief exports to the United Kingdom are *tobacco, petroleum, copper, leather, lard, bacon, and cotton*.

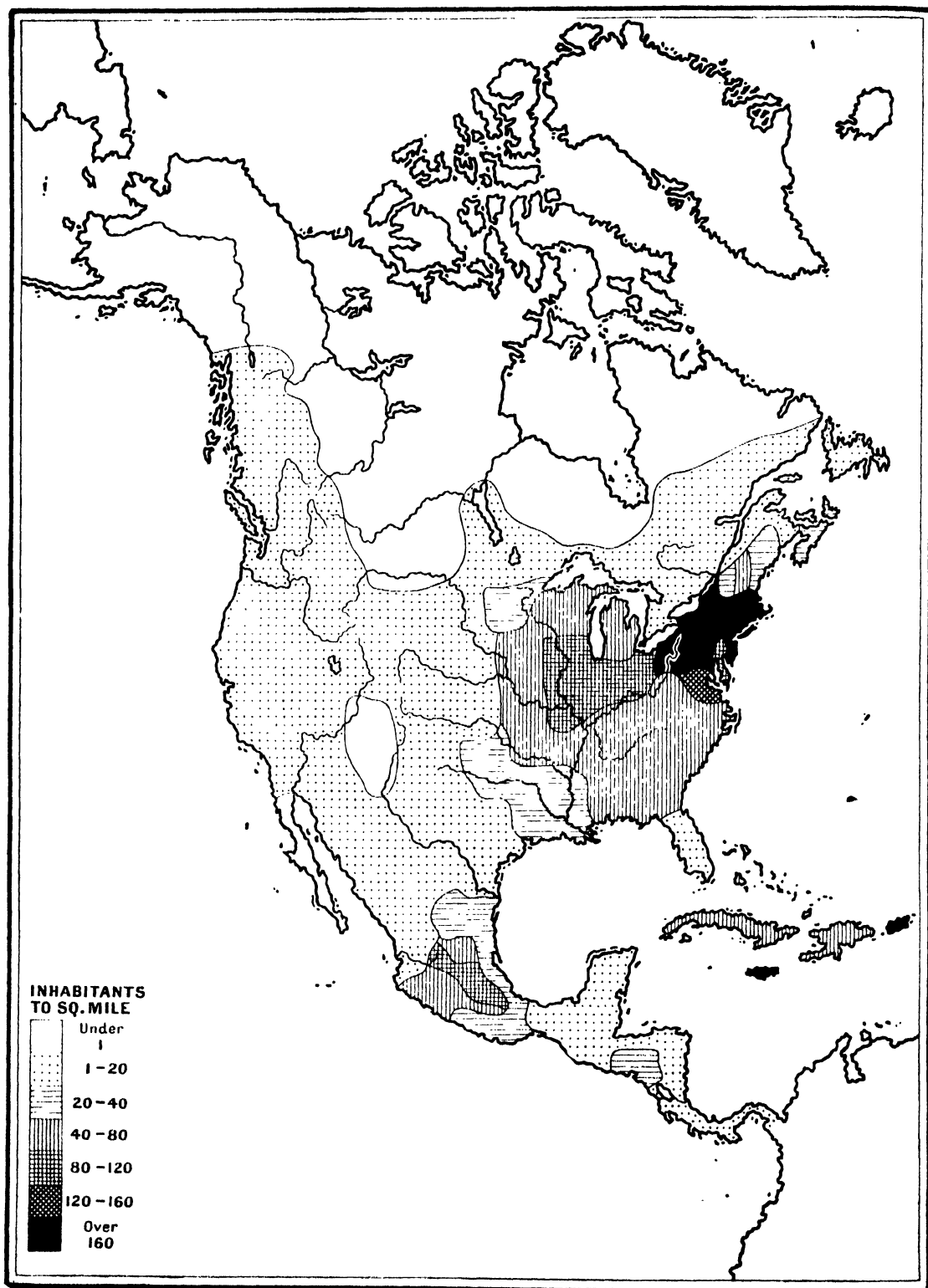
Canadian Commerce.*Eastern Division.*

The great wealth of this area lies in the forests. This has given rise to the *lumbering* industry, which is so very important in the neighbourhood of the St. Lawrence and the Great Lakes. *Forest products* are very largely exported. *Agriculture* is extending, and *fruits* are cultivated in Ontario, mainly in the Hamilton Peninsula. Nova Scotia is noted for its *apple* orchards. *Oats* are the chief cereal of Eastern Canada. *Dairy farming* is becoming very important, and *butter* and *cheese* are valuable products. *Mining* is carried on mainly for *nickel, copper, and asbestos*. The chief exports are *forest products, cheese, butter, oats, fruits, and nickel*.

Western Division.

The chief resources of this division are in the *forests, mines, and fisheries*. The forests are noted for their giant trees of *cedar* and *Douglas fir*. Agriculture is responsible for the production of a variety of *fruits* and a little *wheat*. Mining is carried on mainly for *gold, silver, and coal*. The rivers flowing to the Pacific are particularly rich in *salmon*, and immense quantities are tinned and exported. *Forest products, minerals, and salmon* are the chief exports.

Map 67.



NORTH AMERICA—POPULATION.

Central Division.

This area, like the corresponding part of the United States, has *wheat* as the staple product. The vast prairie of the southern part is being rapidly brought under cultivation, and transformed into a huge granary. *Cattle rearing* is extensively carried on at the foot of the Rockies, and is a very profitable industry. *Wheat* is the chief export.

Newfoundland.

In this colony, fishing is the chief industry, and *fish* forms the most important export. The fish include *cod*, *seals* (for *oil*), *herring*, and *salmon*. Lumbering is also carried on, and a little *pine* is exported.

Chief Exports.

Wheat . . .	£18,000,000
Timber . . .	9,000,000
Silver . . .	4,000,000
Cheese . . .	4,000,000
Flour . . .	4,000,000
Fish . . .	2,000,000
Gold . . .	2,000,000

Chief Imports.

Iron goods . . .	£21,000,000
Coal . . .	8,000,000
Wine and spirits . . .	5,000,000
Woollen goods . . .	5,000,000
Cotton goods . . .	4,000,000

The chief exports to the United Kingdom are *wheat*, *cheese*, *flour*, *timber*, *bacon*, and *apples*.

West Indies.

The West Indies export tropical products either to the United States or to our own country in exchange for manufactured goods. The islands belonging to Great Britain have a greater commercial importance than the remainder. The chief exports are *fruit*, *tobacco*, *coffee*, *sugar*, *rum*, and *timber*, and the chief import *manufactured cotton goods*.

The *Bahamas* have an important export of *sponges*, the chief industry of these islands being sponge fishing.

Jamaica is noted for its *bananas*, *Blue Mountain coffee*, *sugar*, *rum*, *molasses*, *pimento*, and *ginger*.

Trinidad has a large production of *asphalt* from its pitch lake.

Cuba exports the famous "*Havana*" *cigars* and large quantities of *sugar*.

EXERCISES.

1. Name the chief exports of the West Indies.
2. What are the chief animal products of Canada? Name the localities in which they are specially abundant.

3. Write an account of the value of the wheat crop to Canada.
4. Plot a graph to show the value of British import of wheat from Canada.

1907 . . .	£5,200,000	1910 . . .	£7,000,000
1908 . . .	6,500,000	1911 . . .	5,800,000
1909 . . .	7,600,000	1912 . . .	8,800,000

5. Make a similar curve to show the import of cotton goods by the United States from Britain.

1907 . . .	£4,400,000	1910 . . .	£3,500,000
1908 . . .	2,800,000	1911 . . .	3,800,000
1909 . . .	4,100,000	1912 . . .	4,000,000

6. Say what you can of the forest resources of North America.
7. From which parts of North America are the following exported: Gold, timber, tobacco, oranges, apples, silver, pine-apples, and cotton?
8. Name the chief ports of North America for the export of timber, fish, cotton, tobacco, and petroleum respectively.

Population.

Compare the accompanying Map with the preceding ones of North America, and it will be possible to see how natural conditions have determined the distribution of population. The cold Arctic Tundra and the northern forests have a scanty population, as have also the western mountain plateaux, especially in the south, where desert conditions render habitation almost impossible. The northern Atlantic Coastal Plain, opposite the shores of Europe, has a denser population than the hotter cotton lands of the south. The contrast between the productions of the cultivated eastern half of the Central Plain and those of the drier western half is shown also in the distribution of population. The positions of the rich coalfields are also marked by the densely peopled areas.

Although the distribution depends largely upon natural conditions, yet in Canada the population is determined to a great extent by the railway development. At present the wheat lands are cultivated near the railway, but when the more northern lands are developed, then these lands will be settled by an agricultural people, and the same railway construction may cause at Prince Rupert a population similar to that at Vancouver.

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER VIII.

SOUTH AMERICA.

CONTENTS.

World Position and Size—Seas, Coasts, Islands.
Surface.
Climate.
Vegetation—Animals.
Minerals—Manufactures.
Routes—Seaports.
Commerce.
Population.

MAPS.

68 to 71. Climatic Maps.
72, 73. Vegetation and Animal Products.
74. Minerals and Manufactures.
75. Routes.
76, 77. Population and Political.

World Position and Size.

South America forms the southern peninsular half of the island mass known as the New World, and is separated from North America by the Isthmus of Panama. The greater part of South America lies south of the Equator and within the Torrid Zone.

The continent stretches through 67 degrees of latitude. Its area is over 7,000,000 square miles, or nearly twice that of Europe, and more than twice that of Australia.

Seas, Coasts, Islands.

Fig. 29 shows that no part of South America is more than 1000 miles from the sea, and that quite a large area, shown by shading, is less than 400 miles distant from it.

The steep mountain edge of the Brazilian Plateau offers an inhospitable coast along much of the eastern shore, the only important openings in the whole of this coast being the mouths of the great rivers.

In the west the coast, bordered by the lofty Andes, has no opening of importance. In the south-west the submergence of

the coastal chain has caused a number of small islands bordering an indented coast. The stormy waters in the Strait of Magellan, due to tidal action, cause all vessels to double Cape Horn rather than take the route through the strait.

The *Falkland Islands* consist of two large and a number of small islands situated about 250 miles north-east of Tierra del Fuego. Owing to severe gales they are treeless, but their pastures support sheep. *Port Stanley* has a repairing dock for steamers damaged by the strong westerly winds known as the "Roaring Forties."

EXERCISES.

1. Contrast the position of Africa and South America.
2. Draw a comparison between the west coasts of the two American continents.
3. Name the chief destination of vessels which at present travel *via* Cape Horn. Explain why the opening of the Panama Canal will lessen the number of steamships using this route.
4. Explain why the Falkland Islands and the western shores of Southern Chile are subjected to severe gales.

Surface.

The surface can be separated into three divisions similar to those of North America, *i.e.*, the Western Highlands, the Central Plain, and the Eastern Highlands.

The *Western Highlands*, like those of North America, consist of parallel ranges of mountains separated by plateaux. In the south the coastal chain is submerged and forms islands.

The *Central Plain* is open from north to south, as in North America. Notice that in

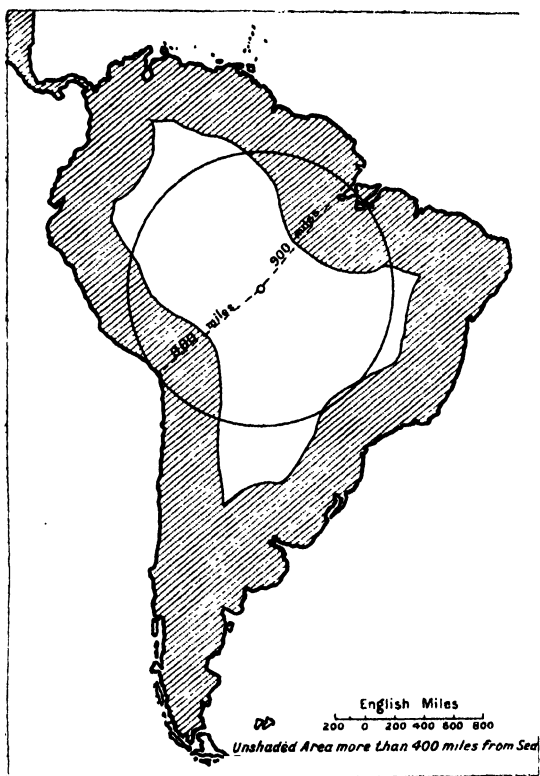


Fig. 29.

South America, the *Casiquiare* joins the *Orinoco* to the *Negro*, which is tributary to the *Amazon*. Note also that the *Tapajos*, a southern tributary of the *Amazon*, rises in the plateau of Matto Grosso near the source of the *Paraguay*.

The *Eastern Highlands* differ entirely from those of North America. They are divided by the Lower Amazon into two parts—the Guiana and the Brazilian Highlands—and both are plateau formations, the latter having

a steep slope to the coast and a more gradual one to the interior plains.

The Western Highlands.

In the far north there are three ranges, the westerly one bordering the west coast, the easterly range following the north coast to the island of Trinidad. Flowing in the valleys between the ranges are the *Magdalena* and the *Cauca*, which join before reaching the north coast. These three ranges converge on the *Plateau of Ecuador*.

South of this plateau there are three parallel ranges, in which rise the *Marañon* and *Ucayali*, upper feeders of the *Amazon*, but these ranges again converge to form two ranges bordering either side of the *Plateau of Bolivia* (2 miles high).

The mountain system gradually narrows in the south, and below *Aconcagua* (the highest peak of the *Andes*) there is only one range on the mainland.

The Central Plain.

This can be divided into three great river basins, *viz.*, the *Orinoco*, the *Amazon*, and the *Paraguay-Parana* systems.

The Orinoco.

This river rises on the southern edge of the Guiana Highlands and empties into the Atlantic, forming a forested delta. The main stream is navigable for 1000 miles, and much of its course is through the grassy plains known as *Llanos* of Venezuela.

The Amazon.

Many of the upper feeders of the *Amazon* drain the parallel ranges of the *Andes*, *e.g.*, the *Marañon* and *Ucayali*. The *Negro* is the most important tributary on the north, while on the south the *Madeira* and the *Tapajos* are the chief feeders. The immense volume of water brought by the numerous tributaries to the main stream is carried to the Atlantic Ocean, and forms a large estuary between *Guiana* and the *Brazilian Highlands*. The force of the tide in this estuary makes it almost useless for shipping, and vessels reach the main stream through the *Para Channel* (the mouth of the *Tocantins River*), which is connected to the *Amazon*.

The Paraguay-Parana Basin.

This river drains a large area south of the Amazon Basin. The eastern slope of the Andes is drained by many tributaries flowing to the Paraguay and the Lower Parana. The *Parana* drains the gradual slope of the Brazilian Highlands, while the *Paraguay* flows due south from the Plateau of Matto Grosso, which separates this basin from that of the Amazon. The *Uruguay*, draining the interior slope of the southern end of the Brazilian Highlands, joins the Parana at its mouth, forming one estuary known as the *Rio de la Plata*. These rivers flowing from west, east, and north to one estuary in the south form a very important waterway, and give easy access for the construction of railways into the interior (*see* Routes).

South of this river basin lies the *Shingle Desert of Patagonia*, a low plateau trenched by rivers draining the eastern slope of the Andes to the Atlantic coast.

The Eastern Highlands.

These consist of the *Guiana Highlands* north of the Amazon estuary, and the *Brazilian Plateau* reaching south of it to the Rio de la Plata.

The Guiana Highlands.

These are highest in the west, and slope towards the coast. They are the remains of a very old plateau, and their present mountainous appearance is the result of years of erosion.

The Brazilian Highlands.

These resemble the tablelands of Africa, the Deccan of India, and West Australia. The tableland is highest near the coast, and slopes towards the interior. Many long, narrow rivers have dissected this plateau, and there are many ranges and valleys parallel to the coast.

EXERCISES.

1. Compare the Congo and Amazon Basins.
2. Explain clearly how the river systems of South America are connected with each other, and compare these with the river systems of North America and Africa.
3. Draw a comparison between the Paraguay-Parana Basin and that of the Mississippi.

Climate.

Compare Maps 68 and 69 showing the January and July Temperatures. Notice that in January a large area stretching from the equator southward has a temperature of above 80° F., and that this temperature decreases southward to 50° F. at Cape Horn. All the isotherms bend southward over the land mass, and this shows that the land possesses a higher temperature than the sea. The July Map shows that the region of greatest heat has shifted north, and that the isotherms have a roughly parallel direction, the temperature on the west being lower than that on the east. This comparison also shows that no part of South America has an extreme climate.

A similar comparison between Maps 70 and 71 showing the Pressures and Rainfall for January and July shows that the lowest pressure and the greatest rainfall occur just south of the equator in January, and that in July this region of low pressure shifts north, enclosing within it the whole north coast.

From a study of these Maps we can divide South America into the following climatic regions east of the Andes:—

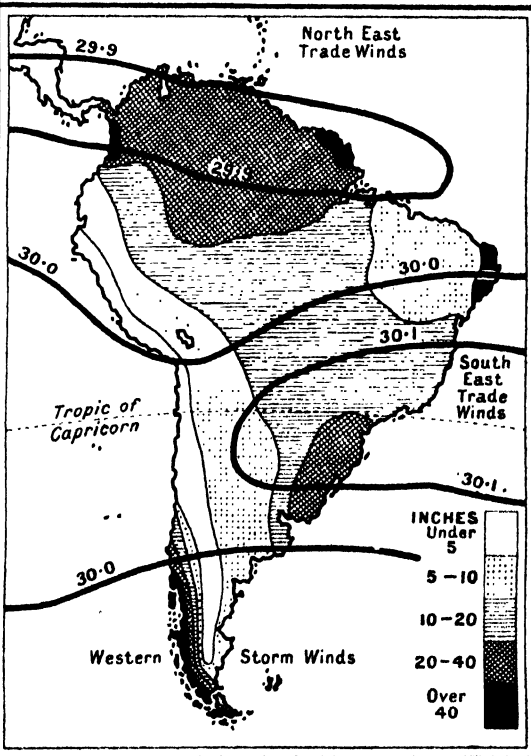
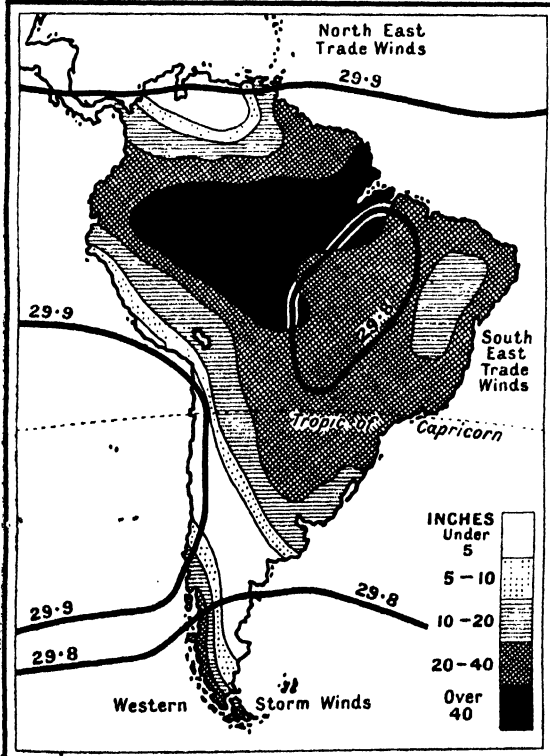
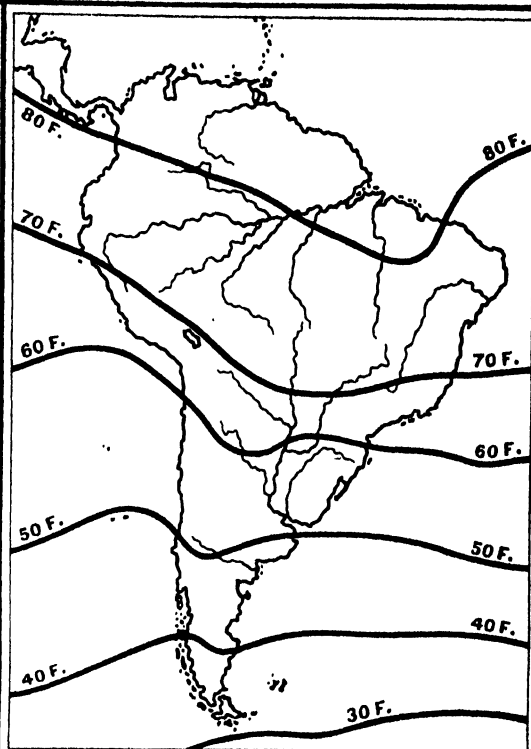
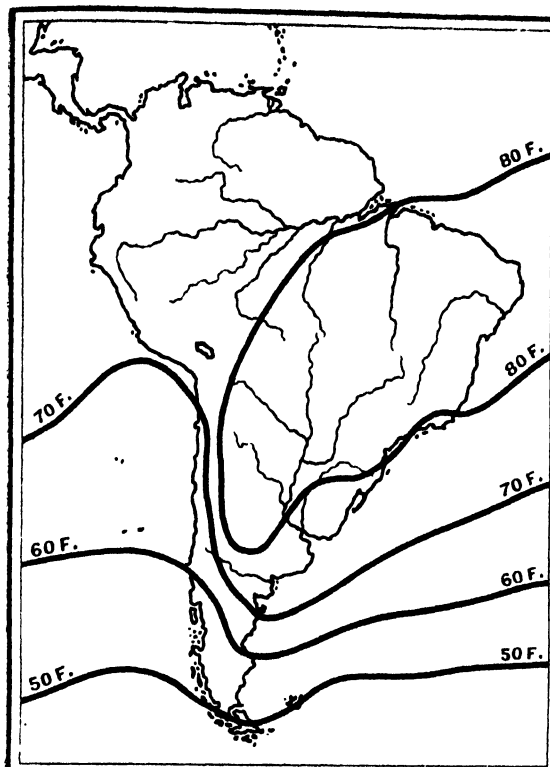
- (1) The north coast, having little rain in January (winter conditions north of the equator) but most in July, especially on the coast slopes of the Guiana Highlands.
- (2) The Amazon Basin, having a heavy rainfall throughout the year, but most in January (summer conditions south of the equator).
- (3) The Brazilian Highlands and Parana-Paraguay Basin, having their greatest rainfall in January (summer) and least in July. Notice two exceptions—(a) the coast lands on the eastern projection near Cape St. Roque have a heavy rainfall in July; (b) the Sao Francisco Basin has little rainfall throughout the year.
- (4) South of the Paraguay-Parana Basin, a region having little rainfall.

The Andes and the west coast can be divided into the following:—

- (1) A northern region, with rain throughout the year, increasing north of the equator in July and south of it in January.
- (2) An area between 10° and 30° S. latitude, with little rainfall throughout the year.
- (3) An area between 30° and 40° S. latitude, with little rain in January (summer) but more in winter (July).

JANUARY ISOTHERMS.

Maps 68-71.
JULY ISOTHERMS.



JANUARY ISOBARS & SUMMER RAINFALL.

JULY ISOBARS & WINTER RAINFALL.

- (4) A region south of 40° S. latitude, having a heavy rainfall.

EXERCISES.

1. Why has South America a less range of temperature than that of any other land mass of a similar size?
2. Show the effect of the Trades and Western Storm Winds upon the climate of South America.
3. Explain the causes of the following: (a) Atacama Desert; (b) Patagonian Desert; (c) Llanos of the Orinoco Basin.
4. Why do the isotherms of South America bend southward as they traverse the continent from west to east?

Vegetation.

Compare Map 72 with the Climatic Maps, and it will be seen that the vegetation regions of South America correspond with the climatic regions. The great Amazon Basin having constant equatorial rains is covered with dense forests, where the undergrowth is impenetrable. Contrast this area, known as the *Selvas*, with the drier grassy *Llanos* of the Orinoco Basin and the similar grass lands of the Argentine known as the *Pampas*. The *Campos* of the Brazilian Plateau form a connecting link between the densely forested *Selvas* and the Grass Lands. They consist of open woodlands and grass lands, and resemble the savannah lands of the African plateaux. In the far south the dry area of Patagonia, east of the Andes, is occupied by a shingle desert incapable of supporting vegetation except along the base of the Andes and on the coast border, where the poor pasture supports a few sheep.

On the west, elevation has an effect upon temperature, and corresponding to the varying elevations are different zones of climate. In Colombia, Ecuador, and Northern Peru the coastal strip has a tropical vegetation, and grows such products as rice and cacao. The warm lower slopes grow coffee and maize, to a height of 6000 feet. Above this to 10,000 feet the more temperate cereals of our own lands flourish, while above this height are treeless plains, capable in some places of growing pasture.

The *Montana* is the region on the east side of the Andes, sloping gradually towards the Amazon Basin. These slopes, like the Amazon Basin, are densely forested.

In Peru and Northern Chile, the region of little rainfall causes the Atacama Desert. The valley of Chile, in the middle of that State, is very fertile, and having a Mediterranean climate, produces wheat and sub-tropical fruits. Southern Chile lies in the track of the Western Storm Winds, and having a wet climate is densely forested with the trees of the Temperate Zone.

The Selvas of the Amazon Basin are comparable to the dense forests of the Congo Region of Africa. Giant trees struggle upward towards the light, and their thick foliage causes the forest to be dark even when the sun is pouring down its vertical rays. The ground is covered by a thick undergrowth of creepers, and this makes the forests impossible for animal life except that of monkeys, birds, reptiles, and insects.

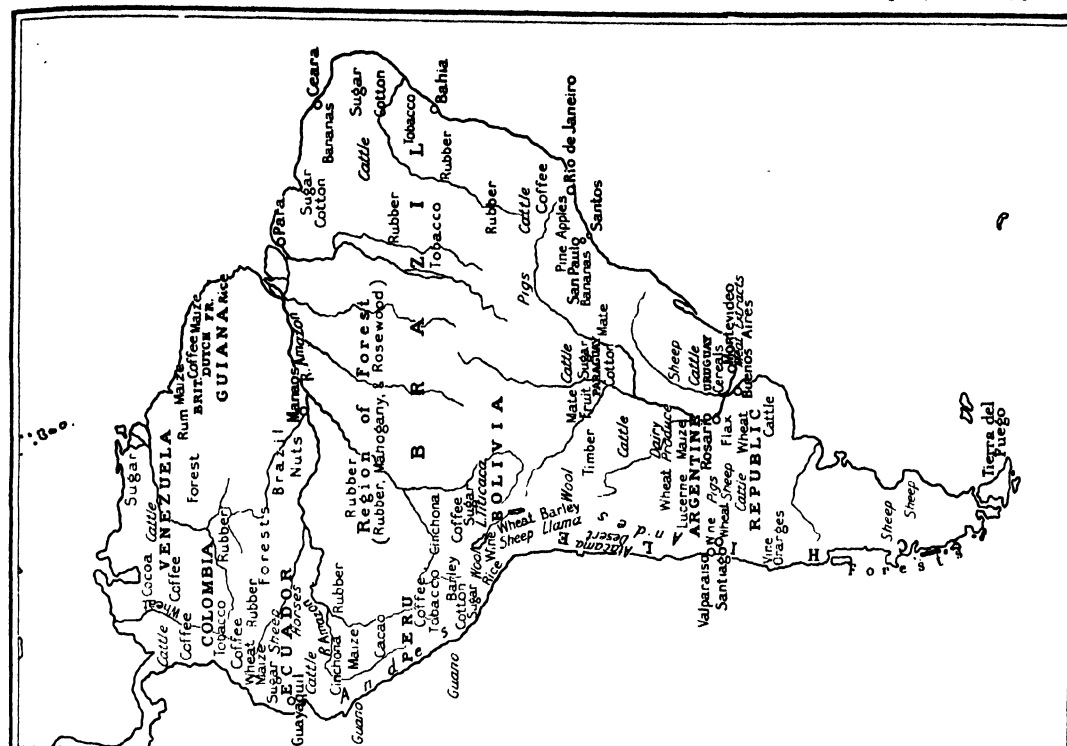
The Llanos have little rain, and during the dry season resemble deserts, but when rain falls, grass springs rapidly into life, and often grows to a great height, forming food for large herds of cattle. To the east of the Llanos lie the Guiana Highlands which, having a heavy rainfall, are densely forested, while the coastal plains on their north-eastern edge are capable of growing tropical products.

The Campos.—The Plateau of Matto Grosso and Brazil form a connecting link between the tropical forests and the drier grass lands. This region consists of park-lands—a mixture of grass lands and open woods—but the poor nature of much of the soil makes it suitable only for cattle pasture except in certain districts along the east coast.

The Pampas.—In the northern parts of Argentine, especially in the river valleys, agriculture is possible, but the greater part of Central Argentine and Uruguay is grass land, which is now being used to support immense herds of cattle and sheep. The monotony of these grass lands is broken by the tall clumps of feathery Pampas grass, while scattered here and there are patches of brilliantly coloured flowers.

The Shingle Desert is a low plateau studded with salt lakes, and, owing to the dry climate, is for the greater part barren.

Tierra del Fuego has a similar barren tableland on the north, while in the south it resembles the forested Andes, of which it is a continuation.



The Animals of South America.

These differ from those of the Old World.

The lion is represented by the puma, the tiger by the jaguar, the crocodile by the alligator, but there is nothing corresponding to the elephant or the rhinoceros. Very large snakes are found in the forests of the Amazon Basin. The llama, alpaca, vicuna of the Andes, and the guanaca of the Patagonian Desert are a species of small camel. The llama is the chief beast of burden across the narrow and dangerous passes of the Andes. The alpaca and vicuna yield valuable supplies of wool, while the guanaca provides the Indians of that desert region with clothing and tent coverings.

Vegetable and Animal Products of Commercial Value.

South America is at present undeveloped, as the lofty mountains and the impenetrable forests have offered great obstacles to the carrying of railways to the interior, while the malarial fevers, which are common in the tropical part, have prevented the white man from fully developing much of the interior. As modern engineers overcome the surface obstacles and carry railways inward, and medical science causes the extermination of the malarial fevers, South America will become of great importance to the civilised world. The *cattle* and *sheep* of her great grass lands now provide the dense populations of the Western World with much of their beef and mutton, and the area thus used will increase as railways are constructed. The tropical forests produce *rubber*, and during recent years rubber-producing plants have been grown on the plateaux, which being elevated are above the limit of malarial fever. *Cacao*, *coffee*, *sugar*, and *tobacco*, in addition to such cereals as *wheat*, *maize*, and *rice*, are now grown in increasing quantities.

Forest Products.

The tropical forests of the Amazon Basin, the Montana, and the Guiana Highlands yield valuable hardwoods, such as *mahogany*, *rosewood*, *logwood*. These are at present but little exported. The chief product is *rubber*, the coagulated juice obtained from a number of tropical trees. *Manaos* on the river Negro and *Para*

• on the coast are the chief ports engaged in this trade.

The growth of rubber on the plateaux causes an important export from *Ceara*, *Bahia*, and *Santos*.

Cinchona is the name of a tree growing along the slopes of the Eastern Andes, the bark of which is invaluable in medicine yielding extracts, the chief of which is *quinine*.

The temperate forests of Southern Chile are thinly peopled, and little or no timber is exported.

Cereals.

Wheat is an important product in the upper valleys of the Magdalena and Cauca and in Ecuador, where, owing to elevation, the climate is more temperate. It is also grown in large quantities in the Middle Chile Valley and in the Lowlands of the Paraguay-Parana Basin, *Rosario* being its chief port.

Maize is an important product in the Paraguay-Parana Basin, and it is also grown on the lower slopes of the Western Andes and on the Guiana coastal plain.

Rice grows on the coastal plain bordering the Northern Andes and in Eastern Brazil.

Coffee, Cocoa, etc.

Coffee.—Brazil has during recent years become one of the most important coffee-producing regions of the world. The two chief districts are in the neighbourhood of Rio de Janeiro and San Paulo. It is also grown on the well-drained lower slopes of the Northern Andes and on the lower slopes of the Guiana Highlands.

Cacao.—This is an important product of the coastal plain of Ecuador in the fertile river valley behind Guayaquil. It is also grown in the Montana Region, on the coastal plains of Venezuela, and in Eastern Brazil.

Maté is a plant grown in the Paraguay Basin, which is used in place of tea in South America.

Sugar-Canes.

These are grown in British Guiana, the coastal lands of Venezuela, Eastern Brazil, in the upper valleys of the Paraguay Basin, and in Peru.

Cotton.

This is grown on the plateaux of Eastern Brazil, in the Upper Paraguay Basin, and in Peru.

Tobacco.

This is grown along the coastal lands of Eastern Brazil and in Colombia.

Fruits.

The tropical varieties, such as *pineapples* and *bananas*, are grown in Southern Brazil, and the subtropical fruits, including the *vine* and *orange*, are an important product of Central Chile.

Animal Products.

The Llanos, Campos, and Pampas all support herds of *cattle* and *sheep*, and these provide an export of *live cattle*, *frozen meat*, *hides*, *wool*, and other animal products.

Live cattle, *beef*, *mutton*, *hides*, and *wool* are the chief products of Uruguay, where *Fray Bentos* and *Paysandu* are important towns and *Montevideo* is the port.

Cattle, *frozen mutton*, *hides*, *wool*, *butter*, and *tallow* form a large percentage of the exports of Argentine through the port of *Buenos Aires*.

Cattle and *sheep* are the chief animals of Southern Brazil. *Sheep* are reared in the Falkland Isles, which exports *wool* and *frozen mutton*.

Pigs are plentiful but of less importance, and roam half wild in Southern Brazil and the Paraguay Basin.

Horses are reared on the Brazilian Plateau and in Central Argentine.

Valuable supplies of *wool* are obtained from the *alpaca* and *vicuna* of the Andes.

EXERCISES.

1. State the position of the Montana, and describe its vegetation.
2. Show the effect of elevation upon climate, and its results upon the vegetation zones of the North-West Andes.
3. Contrast the vegetation in the Selvas and the Pampas. Give reasons for the differences mentioned.
4. What are the climatic conditions upon which the growth of (a) coffee, (b) sugar, (c) cocoa, (d) wheat, (e) the vine, depend? Name the localities in South America noted for each.
5. Draw a map showing the chief cattle and sheep areas of South America. Of what

value are these to the countries of Western Europe? Name the chief towns engaged in this trade.

6. Describe the tropical forests of South America. What are their chief products? Compare them with the tropical forests of Africa.

Minerals.

The plateaux of Brazil and Guiana consist of old rocks similar to those of Africa, and, like them, are rich in minerals, especially *gold* and *diamonds*. The Andes contain immense deposits of *silver*, in addition to *gold* and *copper*. It was this mineral wealth which first attracted large numbers of Spaniards, and many of these settled in South America.

The richest supplies of *silver* in the Andes are obtained from Peru, Bolivia, and Northern Chile. The want of communication has prevented the full development of these, but now two railways cross the Andes to the west coast, while a route is projected joining this mining region to Buenos Aires on the east.

Tin is found south of Lake Titicaca, and *quicksilver* in the Andes of Peru. *Copper* deposits are mined in Northern Chile and in the neighbourhood of *Santiago*.

Brown coal is obtained from the Andes south of Concepcion.

The Atacama Desert of Northern Chile and Peru has deposits of *salt* and *nitrates*, the latter forming an important export to the cotton fields of the United States, where it is used to fertilise the ground.

In the Magdalena and Cauca Valleys of the Northern Andes rich deposits of both *gold* and *silver* are found.

There is a rich *gold field* in the Guiana Highlands on the borders of British Guiana and Venezuela, and gold is also obtained from alluvial deposits.

Gold, *diamonds*, *copper*, *zinc*, *manganese*, and *mercury* are found in the Sao Francisco Basin of Eastern Brazil. The value of the mineral wealth has caused railways to be carried inland from Rio de Janeiro, and also from Santos, to the upper part of this river basin.

Manufactures.

In a thinly peopled and undeveloped continent as South America, the manufactures are comparatively unimportant. The future



SOUTH AMERICA—MINERALS AND MANUFACTURES.

of her trade will depend upon the export of food supplies and raw products to the manufacturing peoples of Western Europe. Most of the manufactures are confined to the necessities of life, the raw products for which can be obtained from local supplies.

Brazil manufactures coarse textiles, leather, soap, candles, and rum, and also manioc flour and tapioca. The latter is obtained from the cassava plant growing in the Amazon Basin. *Cigars and cigarettes* are manufactured at *Bahia*, and diamond cutting is important at *Diamantina*.

Local supplies of cocoa-nuts yielding oil cause a small *soap* manufacture in the ports of *Venezuela*.

Asuncion, the capital of Paraguay, manufactures *cigars, leather, and rum*.

The cattle of Uruguay give rise to slaughtering centres and *meat extract* manufactures at *Fray Bentos* and *Paysandu*. *Montevideo* has *horn and leather* industries

In Argentine cattle farming yields *butter and cheese* made in factories at *Santa Fé*, while the locally grown flax is responsible for *oil mills* at the same centre. The dry climate allows of much *flour-milling*. *Tucuman* has *sugar refining and rum distilling* industries. On the eastern slopes of the Andes the vine grown in the rich volcanic soil causes a *wine* industry.

Buenos Aires manufactures *rough textiles and sacks*.

In the Western States the growth of cacao causes a manufacture of *chocolate* in *Ecuador*, while *Panama hats* are made where the climate is hot and moist. *Santiago*, in Central Chile, has *leather* industries, and makes *wine* from the vine grown in the Middle Chile Valley.

Routes.

Railways have been constructed in South America during the last century, and this has allowed many of the rich vegetable and mineral resources of the interior to be brought to the coast. In many cases the rivers, notably the Amazon and the Paraguay-Parana, form navigable waterways into the interior. The lofty Andes form a difficult barrier between east and west, but modern engineers are overcoming this obstacle, and railways now connect the east with the west coast.

Trace the following routes, observing the chief surface features they utilise:—

A line from *Buenos Aires* on the Rio de la Plata estuary is constructed across the plains of Argentina, and tunnels the Andes under the *Uspallata Pass* to *Valparaiso*, an important seaport on the Pacific coast. (This route was opened for traffic in 1910.)

Valparaiso is connected southward through *Santiago* to the more southern ports of *Concepcion* and *Valdivia*. From the latter a second projected Trans-Andean route is shown joining *Valdivia* to *Bahia Blanca*. Several railway systems connect *Bahia Blanca* with *Buenos Aires*.

Trace all the routes from *Buenos Aires* northward in the Paraguay-Parana Basin, noticing especially the north-western route passing through *Cordoba* and *Tucuman* to the Bolivian border, which is being continued beyond it to tap the rich silver and tin deposits of Bolivia. Note also the route to *Asuncion*, the capital of Paraguay.

From *Montevideo* trace the lines through the cattle areas of Uruguay. Note their connections to *Porto Alegre* and *Rio Grande* on the coast.

In Southern Brazil routes are carried inland from the important ports of *Santos* and *Rio Janeiro* to the coffee plantations of the interior, and similar routes from the more northern ports of *Bahia*, *Pernambuco*, and *Ceara*.

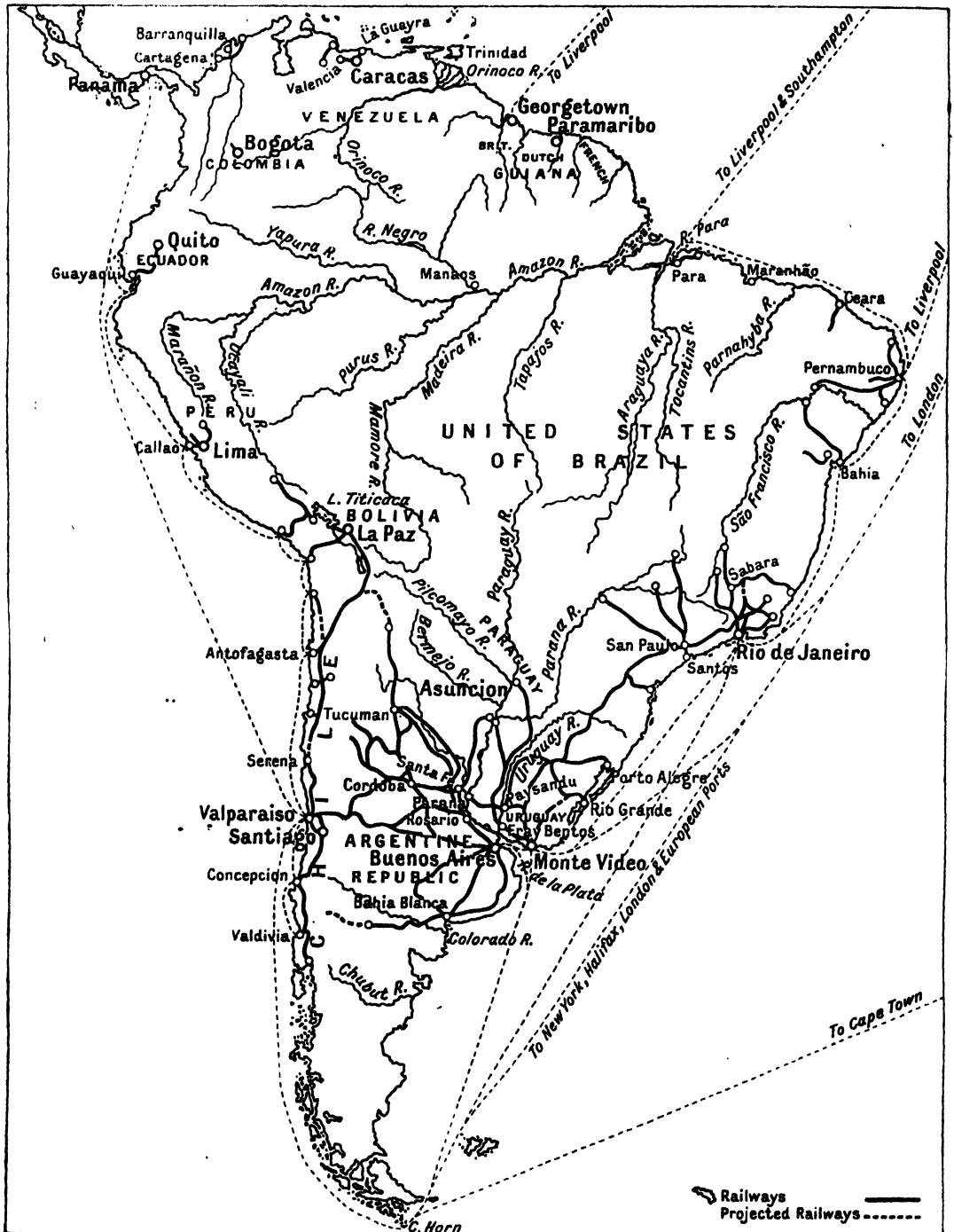
In the Amazon Basin railways are few, as also along the coastal plain of the Guiana Highlands. A railway joins the important town of *Caracas*, the capital of Venezuela, to the seaport of *La Guayra*, and this railway is also carried to the rich coffee-growing district of *Valencia*.

In Colombia railways are scarce, the most important being that which connects the capital *Bogota*, with the river navigation of the Magdalena.

Notice the following Andean railways:—

- (1) From the port of *Guayaquil* to *Quito* on the Plateau of Ecuador an extension of the route is projected to join the river navigation of the Amazon.
- (2) From the port of *Callao* to *Lima*, and inland to the mineral districts of Peru.
- (3) From *Antofagasta* on the coast to the silver districts of *La Paz* south of Lake Titicaca, and continued northward into Peru.

Map 75.



Scale, 663 miles to inch.

ROUTE MAP OF SOUTH AMERICA.

Water Communications.

The rivers of South America, like those of the more northern continent, form a network of waterways, enabling much of the produce of the interior to be brought to the coast.

The *Orinoco* is navigable for 1000 miles.

The main stream of the *Amazon* is navigable to the base of the Andes, a distance of 2600 miles from its mouth, while all its tributaries, especially the *Negro* and the *Madeira*, are navigable for considerable distances, the whole forming 50,000 miles of navigable waterways. The high tides at the estuary make the mouth difficult of navigation, but the connection with the *Para Channel* at the mouth of the river *Tocantins* affords a safe outlet. *Manaos*, on the *Negro* near its confluence with the *Amazon*, is an important river port.

The *Paraguay-Parana* and the *Uruguay* are all navigable for a great part of their courses. The *Paraguay* and Lower *Parana* forms the most important waterway of South America (compare this waterway with that of the *Mississippi*).

The *Sao Francisco* is blocked in its lower course where the river descends from the edge of the plateau, but a railway from this point to the coast affords an outlet for the produce of the interior.

The rivers descending to the west coast are of little use for navigation.

There is a service of steamers on *Lake Titicaca*.

EXERCISES.

1. Describe the chief waterways of South America and show their value for trade.
2. Draw a map of South America between the twentieth and fortieth parallels of latitude, and insert the chief railway routes.
3. Name the chief railways of Brazil. With what object have they been constructed?
4. Name the chief Andean railways. With what object have railways been taken across this difficult barrier?
5. Name the parts of South America in which railways have not been constructed. Give reasons for your answer.

Seaports.

On the west coast *Guayaquil* is the chief port of Ecuador, *Callao* is the chief port of Peru, and *Valparaiso*, *Iquique*, *Concepcion*,

Valdivia, and *Antofagasta* are the chief ports of Chile.

On the east coast *Buenos Aires* is the great outlet of the *Paraguay-Parana* Basin, while *Bahia Blanca* at the mouth of the river *Colorado* is the port for the district farther south, and *Montevideo* the port of Uruguay.

Rio de Janeiro and *Santos* are ports exporting the produce of Southern Brazil, *Bahia* is the port of the *Sao Francisco* Basin, and *Pernambuco* and *Ceara* are outlets of the district farther north. *Para* is the port of the *Amazon* Basin.

On the north coast *Georgetown*, *Paramaribo*, and *Cayenne* are the ports of British, Dutch, and French Guiana, *La Guayra* the port of Venezuela, and *Cartagena* and *Barranquilla* the outlets of the *Magdalena* Basin.

Buenos Aires is the outlet for the agricultural and pastoral districts of Argentina, and from it railways radiate into the interior. It has good dock accommodation. *Rosario*, on the *Parana*, is navigable for ocean steamers. It has a large export of meat and hides.

Santos is the port for *San Paulo*, which is situated in a busy agricultural and mining region. It exports a large amount of coffee.

Guayaquil has an excellent harbour at the estuary of the river. It is within three days' journey of Panama, through which it does most of its trade. The climate of the town is very unhealthy.

Valparaiso has a position similar to that of San Francisco in North America. It is the most important port on the west coast, and is connected by rail with the chief town in the Central Valley of Chile and with *Buenos Aires*.

Callao is a very important port, but an exceedingly poor town. Most of the foreign trade of Peru passes through it.

Iquique is the chief port for the export of nitrate of soda.

Antofagasta has a large export of guano.

Concepcion is a large trading centre. Its port is called *Telcahuano*.

Coquimbo is the chief port of Chile for the export of copper.

Bahia Blanca at the mouth of the *Colorado* River is the chief port of the Argentine for the export of wheat and cattle products.

Montevideo possesses a large harbour, but has the disadvantage of very shallow water off the shore. Goods have to be carried to land from the ships by lighters.

Rio de Janeiro is the chief commercial town of Brazil. It has a good harbour, and exports *coffee* and the *mineral wealth* of the hinterland.

Bahia stands on a good harbour, and has a large export of *coffee* and *tobacco*.

Para is situated on the Amazon estuary. It has almost a monopoly in the export of *rubber*.

Georgetown and *New Amsterdam* are the two chief ports of British Guiana. Their chief export is *sugar*, but they also send out *rum*, *molasses*, *balata*, *gold*, and *rice*. *Georgetown* stands at the mouth of the Delaware River.

Paramaribo is the chief commercial town of Dutch Guiana. It stands at the mouth of the Surinam River, and exports *sugar*, *cocoa*, *rice*, *rum*, and *molasses*.

Cayenne is the best harbour in French Guiana, but is a poor port. The exports are small, and consist mainly of *cocoa*.

La Guayra is the chief port of Venezuela. It is connected to Caracas by rail, and exports *coffee*, *cocoa*, and *rubber*.

Puerto Cabello is the second port of Venezuela, and has an important export of *coffee* and *hides*.

Barranquilla, on the Magdalena in Colombia, is an important river port, but *Sabanilla* on the coast is the chief harbour. They export large quantities of *coffee* and *bananas*.

Commerce.

The commerce of South America is increasing rapidly as railways are being carried into the country. The Atlantic coast is of greater commercial importance than the Pacific, since it receives the chief rivers of the continent. These rivers serve as natural routes into the interior, and their estuaries form good harbours. The Andes are, moreover, set close to the Pacific shore, and the bulk of the country forms the Atlantic slope, which possesses wonderful resources in its forests and grass lands. The unsettled condition of political affairs in some of the states of South America has, in the past, acted as a deterrent to trade.

Argentine Republic.

The great source of wealth in this state are the magnificent grass areas (pampas). These support large numbers of cattle and sheep, and lead to an important export

trade in *frozen meat*, *wool*, and *skins*. The export of *live cattle* is an increasing industry. Agriculture is becoming more important, and *wheat*, *maize*, and *linseed* are exported. *Manufactured goods* and *metals* form the chief imports.

Buenos Aires is the chief commercial centre, and routes radiate from it to all parts.

Chief Exports.

Live stock	
products	£32,000,000
Maize	20,000,000
Wheat	19,000,000
Linseed	4,000,000

Chief Imports.

Textiles	£18,000,000
Iron goods	10,000,000
Pottery	7,000,000

Bolivia.

Bolivia is an inland country, and so here products have to be exported through the ports of other divisions of the continent, mainly *via Mollendo* and *Antofagasta*. *Antofagasta* is connected to *La Paz*, the capital, by a railway 700 miles in length. Transport charges considerably restrict the commerce of this state.

Chief Exports.

Tin	£4,000,000
Rubber	1,500,000
Silver	350,000

Chief Imports.

Textiles, machinery, hardware, clothing, and provisions.	
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Brazil.

The chief industry of Brazil is agriculture, and it has the largest output in the world of *coffee* and *rubber*. Coffee is grown largely in the states of San Paulo and Rio de Janeiro, the former producing quite half the world's output. *Cocoa* and *rice* are also cultivated, and the mines of the state are a source of great wealth.

Rio de Janeiro is the chief commercial centre of the country.

Chief Exports.

Coffee	£41,000,000
Rubber	10,000,000
Yerba maté	2,000,000

Chief Imports.

Machinery, coal, and textiles.	
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Chile.

The chief occupations of this state are agriculture and mining. Agriculture is practically restricted to the southern part, where the regular winds supply abundant rain. In this part *wheat* and *fruits* are produced, and the forests supply a fair amount of *timber*. The cultivation of the *vine* is leading to a growing export of *wine*. It is in the northern

part of Chile, however, that the chief resources of the country are to be found. *Chile salt-petre (nitrate)* is there found in very large quantities, and is exported for the manufacture of chemicals and for use as a fertiliser. *Copper* and *tin* are also exported from the same area.

The chief exports are *nitrate, copper, tin, and wool*, while *textile goods, coal, and machinery* are imported. *Antofagasta* and *Iquique* are the chief of the nitrate ports, but *Valparaiso* is the most important port of the country.

Value of Exports.

Minerals (nitrate, copper, and tin)	£25,000,000
Vegetable products	1,000,000

Colombia.

Colombia possesses a fertile soil, and *coffee, cocoa, tobacco, and fruits* are produced. The trade in these commodities is, however, comparatively small, mainly owing to defective means of transport. A large amount of *rubber* is yielded, and efforts are being made to increase the output by cultivation. The mineral wealth of the state is very great, *gold* and *silver* being largely exported, but *copper* and *platinum* are also mined. Colombia is also noted for its *emeralds*.

The chief exports are *coffee, bananas, gold, rubber, and cocoa*, and the imports are mainly *cotton goods* and *fuel*. *Barranquilla* is the chief commercial centre of the country.

Value of Exports.

Coffee	£3,500,000
Hides	900,000
Bananas	700,000

Ecuador.

The great product of this division is *cocoa*, and this is very largely grown in the coastal district. Ecuador is one of the chief sources of the world's supply of *cocoa*. The export of *coffee*, from the same district, is also becoming important. The forests of the eastern part yield a very large supply of *rubber*, and, as in Colombia, this is being increased by cultivation. *Ivory nuts* also form an important export. Mining is a minor industry.

The chief imports are *textile goods* and *food-stuffs*. *Guayaquil* is the most important commercial town.

Value of Exports.

Cocoa	£2,000,000
Ivory nuts	430,000

British Guiana.

In this division agriculture and mining are both important industries. *Sugar cane* production is very important, and gives an export of *sugar, molasses, and rum*. The other agricultural products exported are *rice* and *balata*. As a result of the mining *gold* and *diamonds* are obtained, and the forest area yields valuable *timber*.

The chief imports are *foodstuffs* and *manufactured goods*. *Georgetown* and *New Amsterdam* are the chief commercial centres.

Value of Exports.

Sugar	£1,100,000
Gold	180,000
Rum	150,000

Dutch Guiana.

Sugar is the most important product in this state, but *rice, maize, cocoa, rum, and molasses* are also yielded. *Gold* is mined and exported. *Paramaribo* is the commercial centre.

French Guiana.

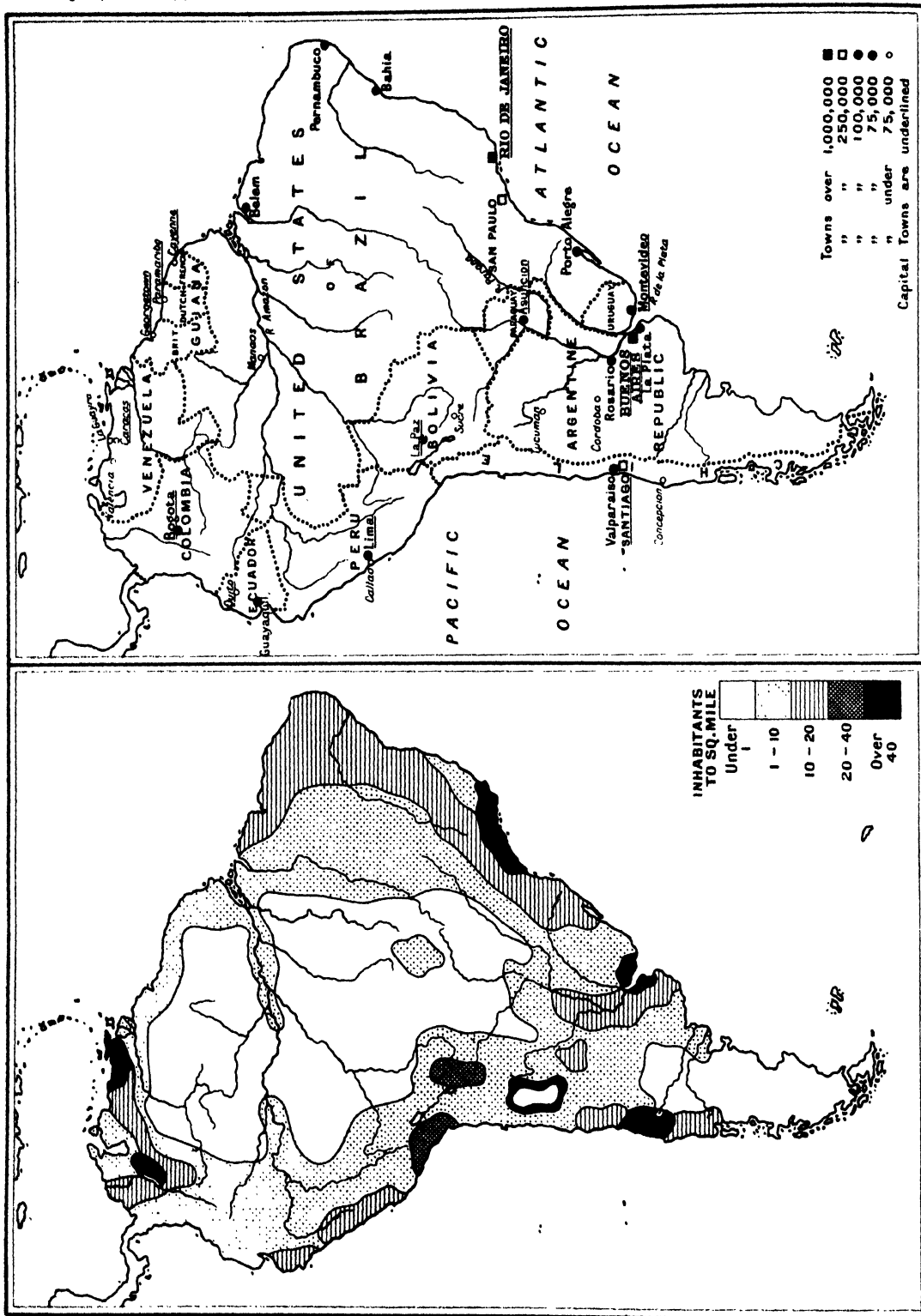
Agriculture is not so important as in the other Guianas, the chief industry being *gold* mining. *Sugar, molasses, rum, cocoa, bananas, and coffee* are important exports. *Cayenne* is the chief port.

Paraguay.

The chief industries are *cattle rearing* and the obtaining of *forest* products. *Tobacco* is cultivated, and the state is noted for its *oranges*. *Paraguay* tea (*yerba*) is the chief of the other products.

The most important exports are *hides, meat, tobacco, yerba, and timber*, while *textile goods* are the chief import.

The country is inland, and most of its commerce passes along the Paraguay River. *Asuncion* is the chief town.



SOUTH AMERICA—POLITICAL DIVISIONS.

SOUTH AMERICA—POPULATION.

Peru.

Minerals and forest produce are the chief resources of Peru, but agriculture is extending, and gives rise to an export of *cotton* and *sugar*. The mineral wealth is very varied, but *gold*, *silver*, and *copper* are the chief metals exported.

Besides *timber* the forest area yields *rubber* and the important drugs *cocaine* and *quinine*. *Callao* is the chief port.

Value of Exports.

Minerals (gold, silver)	£4,000,000
Copper	2,000,000
Sugar	1,500,000
Cotton	1,100,000
Petroleum . . .	800,000

Uruguay.

Agriculture is making rapid progress in this State, and there is a large output of *wheat* and *linseed*. Pastoral industries, however, predominate, *sheep* and *cattle* being very extensively reared.

Animal products form the chief exports. *Paysandu* is noted for its *ox tongue*, and *Fray Bentos* for its *meat extracts*. *Wool* and *hides* head the export list. *Fuel* and *manufactured goods* are the chief imports.

Venezuela.

Agriculture is responsible for a large output of *coffee* and *cocoa*. The *sugar cane* and *vanilla* are also produced. In the pastoral belt *cattle* and *goats* are reared, and *hides* form an important export. The forest area forms a valuable source of wealth, resulting in a large output of *rubber* and *gum*. Minerals are abundant, *gold*, *silver*, and *copper* being the chief worked.

The chief exports are *coffee*, *cocoa*, *rubber*, *hides*, and *gold*. The imports are mainly *manufactures*. Value of coffee export, £3,300,000.

Population.

By comparing the Population Map with those showing Rainfall and Vegetation it

will be possible to find the causes for the distribution of population, which totals over 40,000,000, and averages six persons to 1 mile.

The areas of least population are the dense, impenetrable forests of the Amazon, the Atacama Desert of Peru and Northern Chile, and the shingle desert of Patagonia. The lofty plateaux of the Andes and the Brazilian Highlands have a relatively greater population, and the grass and agricultural lands of the Paraguay-Parana and Orinoco Basins are still more populous. The most densely peopled regions are in the rich agricultural and mining district of South-East Brazil, at the estuary of La Plata, and in the Middle Chile Valley.

EXERCISES.

1. From which parts of South America are the following exported: meat extract, rubber, coffee, and sugar?
2. Say what you can of the commercial importance of the forest area of South America.
3. Classify the South American States with regard to their importance for (a) coffee, (b) cocoa, (c) rubber.
4. Name the chief medicinal products and the sources from which they are derived.
5. Make a graph to show the export of wool from the Argentine Republic:—

1906	150,000 tons
1907	155,000 „
1908	176,000 „
1910	150,000 „
1911	132,000 „
1912	165,000 „
6. Make a similar graph to show the coffee export of Brazil:—

1908	£23,000,000
1909	33,000,000
1910	37,000,000
1911	40,000,000
1912	46,000,000
1913	41,000,000
7. Name the ports exporting large quantities of nitre, coffee, animal products, rubber, and sugar respectively.
8. What are the chief mineral exports of South America, and from which parts are they derived?

COMMERCIAL ATLAS GEOGRAPHY.

CHAPTER IX.

AUSTRALASIA.

CONTENTS.

World Position and Size—Seas, Coasts, Islands.
Australia—Surface; New Zealand—Surface.
Climate.
Vegetation and Animals.
Minerals—Manufactures.
Routes—Railways—River Navigation—Ports.
Commerce.
Population.

MAPS.

78 to 81. Climatic Maps.
82, 83. Vegetation and Animal Products.
84. Minerals and Manufactures.
85. Routes.
86, 87. Population and Political.

World Position and Size.

The large island of New Guinea is separated from Australia by the shallow *Torres Strait*, and in the south the smaller island of *Tasmania* is separated by a similar shallow channel known as *Bass Strait*. Due east of Bass Strait, but 1200 miles away, are three islands—*North Island*, *South Island*, and *Stewart Island*—which together form the *Dominion of New Zealand*. Situated in the South Pacific Ocean, to the north of New Zealand and east of Australia, are a number of scattered groups of islands, of which the chief are *New Caledonia*, the *Solomon Islands*, the *Fiji Islands*, *Hawaii*, and *Samoa*. The continent of Australia, New Guinea, Tasmania, New Zealand, and the groups of islands together form *Australasia* (Southern Asia).

Australia is not so closely connected as the other continents with the land masses of the world, and this probably accounts for the difference between its native plants and animals and those of the remainder of the world (*see* Vegetation of Australia).

The island continent of Australia lies between 10° and 40° S. latitude, and more than half of the continent falls within the tropics.

Notice that New Zealand lies between 34° and 47° S. latitude.

Australia is the smallest continent of the world, having an area of 3,000,000 square miles, or less than that of Europe. The large island of New Guinea has an area one and a half times that of France. Tasmania is much smaller, having an area of 26,000 square miles, or about half that of England. The Dominion of New Zealand has an area of 105,000 square miles, or less than that of the British Isles.

Seas, Coasts, Islands.

Notice that Australia is a compact mass with few large openings. On the rocky east coast there are some excellent harbours, where important ports have grown up. The chief of these is *Port Jackson*.

North Island, New Zealand, consists of a long northern peninsula indented by many bays giving easy access to the sea. South Island resembles Scandinavia in possessing a fiord coast on the west and a more regular coast line on the east.

Between the *Barrier Reef* and the mainland is a calm channel varying from 20 to 150 miles in width. This reef is broken in places, where the outlet of a fresh-water river has prevented the work of the coral polyp. The value of the channel is lessened by the numerous islands and submerged ridges which make navigation difficult.

Pacific Islands.

There are a number of small islands lying within the tropics in the Pacific Ocean which are mostly of coral or volcanic origin. Cocoanuts and copra (the dried kernel used in soap and candle manufacture) are the chief products, and

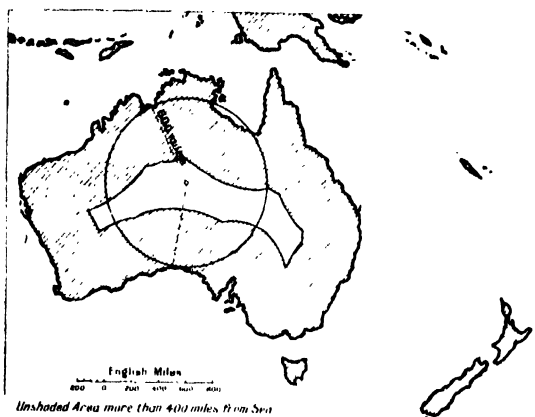


Fig. 30.

tropical products, including pineapples, bananas, coffee, tobacco, cotton, sugar, and rice, are grown.

EXERCISES.

1. Show how Australasia is connected with the continent of Asia.
2. Describe the Barrier Reef. What disadvantages are there to using the calm channel between it and the mainland for shipping?
3. Describe the coasts of South Island, New Zealand, and compare with those of Ireland.

Australia, Surface.

Australia may be divided into the three following regions:—

1. A belt of highland known as the *Great Dividing Range*. This ridge has its steep slope to the east, being separated from the coast by a narrow plain, but slopes gradually westward to the interior.
2. The *Central Lowlands*, from the Gulf of Carpentaria in the north to St. Vincent and Spencer Gulfs in the south.
3. West of this, and occupying the greater part of Australia, is a *great tableland* bordered by a *narrow coastal plain*.

Eastern Highlands or Great Dividing Range.

These are highest in the south-east, where they form the *Blue Mountains* and *Australian Alps*, rising in *Mt. Townsend* to over 7000 feet. Farther north the Eastern Barrier is known as the *Liverpool Range*. The gradual western slope of the Dividing Range is drained by numerous rivers, many of which are intermittent. In the dry season they become dried water-courses, but during the wet season form flood streams. The *Murray-Darling* system drains the greater part of the interior slope, and its main stream, owing to the melting snows from the Dividing Range, is able to maintain its flow throughout the year.

The mountain ranges farther north are not nearly so difficult to cross, and the wider coastal plains allow of such rivers as the *Burdekin* flowing to the east coast.

A great part of the Murray-Darling system is so shallow as to be unfit for navigation. At its mouth the Murray enters *Lake Alexandrina*, a shallow lagoon separated from the open sea by a narrow spit of sand.

The Central Lowlands.

Find on the map the rivers draining to the Gulf of Carpentaria. Notice where they rise. The chief of these is the *Flinders*, whose source is quite near that of the *Burdekin*, flowing to the east coast.

Find also the rivers draining to the great depression in the centre, in which are *Lakes Eyre* and *Gregory*. Find the *Grey Range*, which separates this system of drainage from that of the *Murray-Darling*. All of these rivers flow only during the wet season. The largest is *Cooper's Creek*, which rises not far from the *Flinders River*. Compare this basin with the inland drainage system of *Lake Tchad* in Northern Africa.

Western Tablelands.

The remainder of the continent is occupied by a low tableland about 1000 feet high, rising to steep edges along the coast. Across the centre of the tableland, running in an east and west direction, is a belt of higher ground forming the *MacDonnell Range*. As this tableland forms a desert, comparable to the Sahara, few rivers drain it. Most of them rise on the wetter edges of the plateau, and flow across a narrow coastal plain to the sea.

New Zealand, Surface.

South Island is much loftier than North Island. Notice a backbone of mountains known as the *Southern Alps* running through the island. The steep slope of this to the west coast, which is indented with long fiords, and the more gradual slope to the east, where the coast is more regular, resemble both Scotland and Scandinavia.

This range is continued in North Island as far as *East Cape*. West of this, and quite distinct from the mountain range, are the active volcanoes of *Tongariro* and *Ruapehu*, and the extinct volcano of *Mt. Egmont*, which forms a projection on the west coast. Connected with the volcanoes are numerous hot springs and geysers.

EXERCISES.

1. Divide Australia into three natural regions, and show how these surface divisions resemble those of India.
2. Name the ranges forming part of the Eastern Barrier. Explain why the early settlers in Australia were confined to the coastal plain.
3. What points of comparison and contrast can you draw between the deserts of Western Australia and the Sahara?
4. Describe the surface of New Zealand, and compare that of South Island with the surface of Norway.

Climate.

Carefully study Maps 78 and 79 showing the January and July Isotherms. Notice that the hottest month is January, and during that month the greater part of the continent has an average temperature over 80° F., while the centre has a temperature above 90° F. Only in the south and east does the average temperature fall below 80° F.

Comparing this with the July Isotherms, we find that the centre has an extreme climate with a range between 20° and 40° F., while the east coasts have a more equable temperature.

Make a similar comparison between Maps 80 and 81 showing the summer and winter rainfall, and notice that the centre has little or no rain throughout the year; that the northern coasts have a heavy summer rainfall, decreasing rapidly with distance from the sea; and that the east coast has rain all the year, but most in summer. During this season

the rain is felt on the western slopes of the Dividing Range, and even in the Central Lowlands. On the south notice there is both a summer and winter rainfall, and that these parts get a heavier winter rainfall than the rest of the continent.

New Guinea has a heavy rainfall, greatest in summer along its northern shores. Tasmania and New Zealand have rain all the year, the western slopes of all the islands having a greater rainfall than the east.

The prevailing wind on the east coast is the *South-East Trade*, which, laden with moisture from off the Southern Pacific Ocean, meets the Dividing Range, and in rising to get over same brings heavy rainfall to the Coastal Plain. In Queensland monsoons and South-East Trades together cause a heavy summer rainfall.

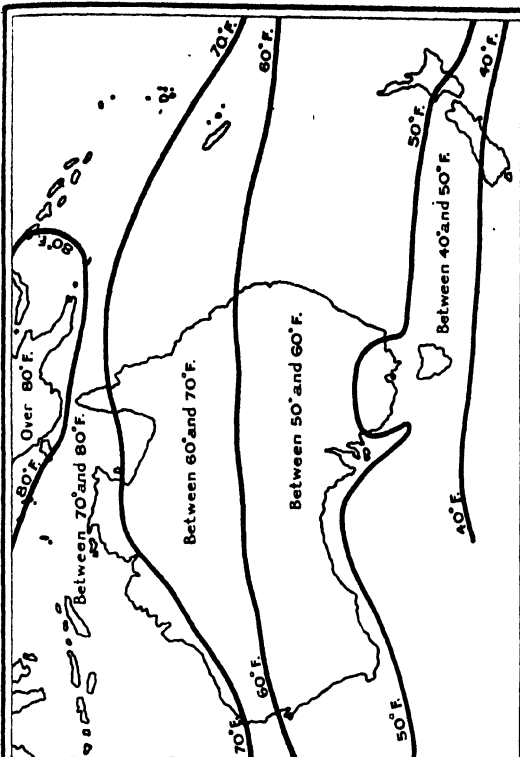
The fortieth parallel of latitude passes through Bass Strait and the middle of New Zealand. South of this the *Western Storm Winds* or "*Roaring Forties*" bring rain all the year to the *west coasts of Tasmania* and *South Island (New Zealand)*, while their gradual eastern slopes are drier (compare with the British Isles).

North of the fortieth parallel there is a belt similar to the Mediterranean Region, which, owing to the shifting of the sun's vertical rays north and south of the equator, has *South-East Trades* in *summer* and warm, wet, *Western Storm Winds* in *winter*. The areas having this Mediterranean type of climate are *Victoria*, the *south coast of South Australia*, and the *south-west corner of Western Australia*.

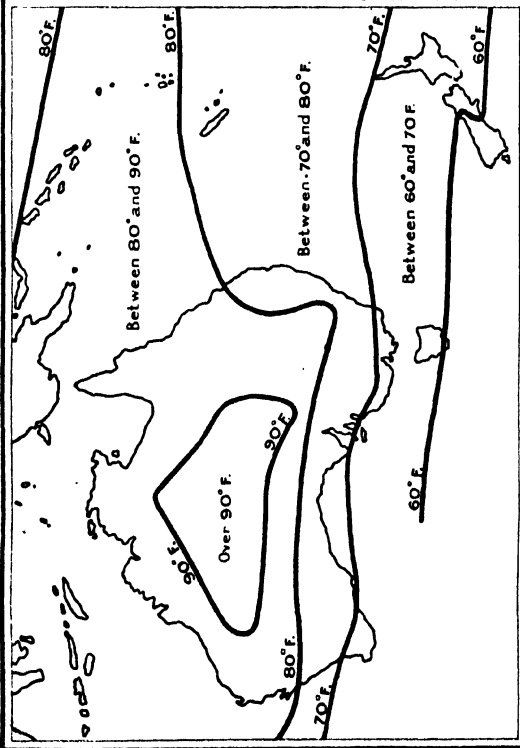
EXERCISES.

1. What is a monsoon? Compare and contrast, giving reasons for your answer, the effects of the monsoons in India and Australia.
2. Explain clearly why most of the rivers which drain the western slope of the Great Dividing Range are intermittent.
3. Why are the forests on the north of Australia limited to the Coastal Plain, and why does the interior form poor pasture or desert?
4. Compare the climate of Tasmania, South Island (New Zealand), and Ireland, and show the effect of climate on the surface and products in each case.
5. Draw a comparison between the climates of British South Africa and Australia.

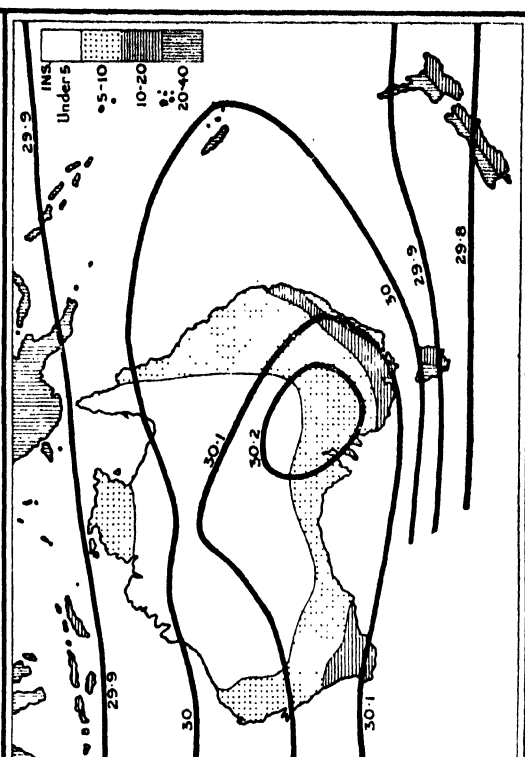
JULY ISOTHERMS.



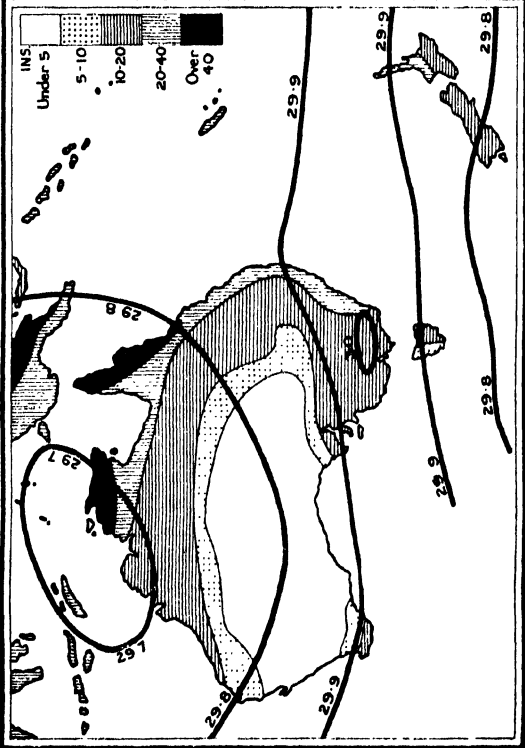
JANUARY ISOTHERMS.



WINTER RAINFALL.



SUMMER RAINFALL.



6. Why has the coastal plain of (Queensland a heavy summer rainfall?

Vegetation and Animals.

A careful comparison of the Surface and Climatic Maps will show that Australasia can be divided into the following well-defined regions:—

- (1) *The interior of the Western Tablelands*, having extremes of temperature with little or no rain, consists chiefly of desert or poor grass lands.
- (2) *The Northern Shores*, falling within the tropics and having heavy summer monsoon rains, are thickly forested, but, as the effect of the rain is shut off from the interior by the steep edges of the tableland, these forests quickly merge into poor scrub and grass lands towards the desert interior.
- (3) *The Eastern Coastal Plain* and the *windward slope of the mountains*, having a warm equable temperature and rain throughout the year, are capable of producing rich vegetation.
- (4) *The leeward slope of the mountains* and the *Central Lowlands* get a small rainfall during summer, and these lands form pasturage for sheep. It has been already pointed out that the rivers of this region are mostly intermittent.
- (5) *Victoria, South Australia, South-West Australia, and North Island (New Zealand)* have the Mediterranean type of climate, and produce crops similar to those of the Mediterranean Region.
- (6) *Tasmania and South Island (New Zealand)* get the full influence of the warm westerly winds which drench the western coasts, causing these to be thickly forested. The drier eastern slopes are suitable for agriculture and pasturage.
- (7) *New Guinea* lies south of the equator, and has rain throughout the year. It is covered, therefore, with tropical forests.

The first European settlers in Australia found a plant and animal life differing from that of the other continents, and useless as a food supply. Domestic plants and animals have been introduced from Europe, and have adapted themselves so well to their new home that Australia now exports large quantities of both animal and vegetable food supplies.

The original animals found in Australia were of the kangaroo type with pouches in

which to carry their young, and moving from place to place on their hind feet. The dingo or native dog is the only large animal not of this type. The chief birds were the emu (a black ostrich), the cassowary, the lyre bird, the black swan, and the giant kingfisher, while the reptiles included lizards, crocodiles, snakes, and worms, the latter sometimes 6 feet long.

The native plants and trees are peculiarly suited to the hot, dry climate. The trees shed their bark instead of their leaves, which hang vertically. In the more arid regions the scrub consists of bushes carrying sharp spines, thus making progress through them difficult. The salt bush, the most valuable plant of these regions, flourishes in a salt soil where rain is scarce, and yields food for sheep and cattle. The native grasses are numerous, and able to withstand periods of drought. The chief trees are gums and acacias, and these are found on the wetter coast margins.

The rabbit, since its introduction by British settlers, has so multiplied as to become a danger to the crops.

The Western Tablelands.

These, consisting of desert and poor pasture, are incapable of producing any commercial products. A few oases make camel communication possible across this desert. The forests of the northern margin yield valuable *timber*.

The Central Lowlands and the Western Slopes of the Dividing Range.

The northern margin, having monsoon rains, is heavily forested, but the interior is poor pasture land. The dry western slopes of the mountains and the more arid Central Lowlands are great *sheep-producing areas*. *Wool* and other *animal products* are the largest export of Queensland, New South Wales, and Victoria. Water is obtained in the lowlands by sinking artesian wells into the underlying rocks.

The Eastern Slopes of the Dividing Range and the Coastal Plain.

As the northern part lies within the tropics its lower slopes are clothed with tropical forests, producing valuable *timber*, while *sugar cane, rice, tobacco, maize, wheat*, and the *vine* are cultivated and exported.

Farther south, in New South Wales, the soil is less fertile, and agriculture is only important in parts, e.g., *Bathurst*.

The Mediterranean Lands.

Victoria is a densely peopled, highly productive State. The *Mildura* region, irrigated by water from the river Murray, produces *grapes, oranges, figs, apricots, peaches, and plums*, in addition to *maize, tobacco, and fibres*. Farther south the cleared lands grow quantities of *wheat*, and *sugar-beet* cultivation is increasing. Dairy cattle supply large quantities of *butter* for export.

South Australia, occupying the southern margin of the Central Lowlands, produces a hard *wheat*, in addition to Mediterranean fruits, particularly the *vine* and *olive*.

South West Australia has extensive forests of *jarrah* and other *hard woods*, and in the cultivated parts produces quantities of *vines, cereals, and Mediterranean fruits*.

North Island (New Zealand) produces *timber*, especially the *Kauri gum*. *Oranges, lemons, and the vine* are cultivated, in addition to *wheat* and *other cereals*.

South Island (New Zealand) and Tasmania.

Thick forests clothe the western slopes, beautiful tree ferns, sometimes 50 feet high, being a feature of the New Zealand forests. The drier eastern slopes and plains are rich pasture lands stocked with *cattle and sheep*, or agricultural lands, from which *flax* and *hemp* are the chief products.

Tasmania produces *wheat, oats, potatoes, fruits, and hops*, and thus resembles the British Isles.

New Guinea.

This island is densely forested, and where clearings are made, crops of such products as *bananas, yams, sugar-cane, and tobacco* can be grown by the natives with little cultivation on their part. Much of the interior is still unexplored. *Sandal-wood, ebony, and other valuable timbers* are plentiful, and the *cocoanut* and *sago palm* grow everywhere.

EXERCISES.

1. Name the parts of Australia and New Zealand which pasture sheep. Explain why so much of these lands is devoted to pasture.
2. Compare the cultivated products of the southern regions of Australia with those of the lands bordering the Mediterranean Sea.
3. Name the chief products of the Coastal Plain of Queensland. How do these differ from the products obtained farther south? Give reasons.
4. Draw a map showing the chief forest areas of Australasia.
5. How do the native plants and animals of Australia differ from those of the remainder of the Old World? Show how the former are peculiarly suited to the climate.

Minerals.

Australasia has very rich mineral deposits, and these are largely responsible for the rapid development and great prosperity of both the island continent of Australia and the Dominion of New Zealand. Emigrants from Britain were first attracted by these rich resources of mineral wealth, and many of these settled down in the continent and developed not only its mineral supply, but its agriculture and pasture lands.

Gold is the most important mineral of Australia, being found in all the States. The richest deposits are found in *Western Australia, Queensland, and Victoria*. Originally gold was found at the surface, but now these diggings are exhausted, and it is obtained from quartz reefs, to which shafts have had to be sunk.

Ballarat and *Bendigo* are the two chief gold-producing districts in *Victoria*. The former was a rich surface digging, but at both places the gold is now obtained from quartz blocks, which have to be crushed and the gold extracted.

In *Queensland* the chief gold-mining centres are *Charters Towers*, near the Burdekin River, and *Mt. Morgan*, which is connected by rail to Rockhampton.

Western Australia has rich supplies of gold in the *Coolgardie, Kalbarli, Murchison, and Menzies* districts. Notice on your map that these are in the western deserts, and mining has only been made possible by carrying water supplies in addition to the railways.

Gold is not quite so plentiful in New South Wales; the chief centres are at *Bathurst* and *Goulburn*.

Tasmania has rich supplies of gold.

New Zealand has rich deposits in the *Thames*

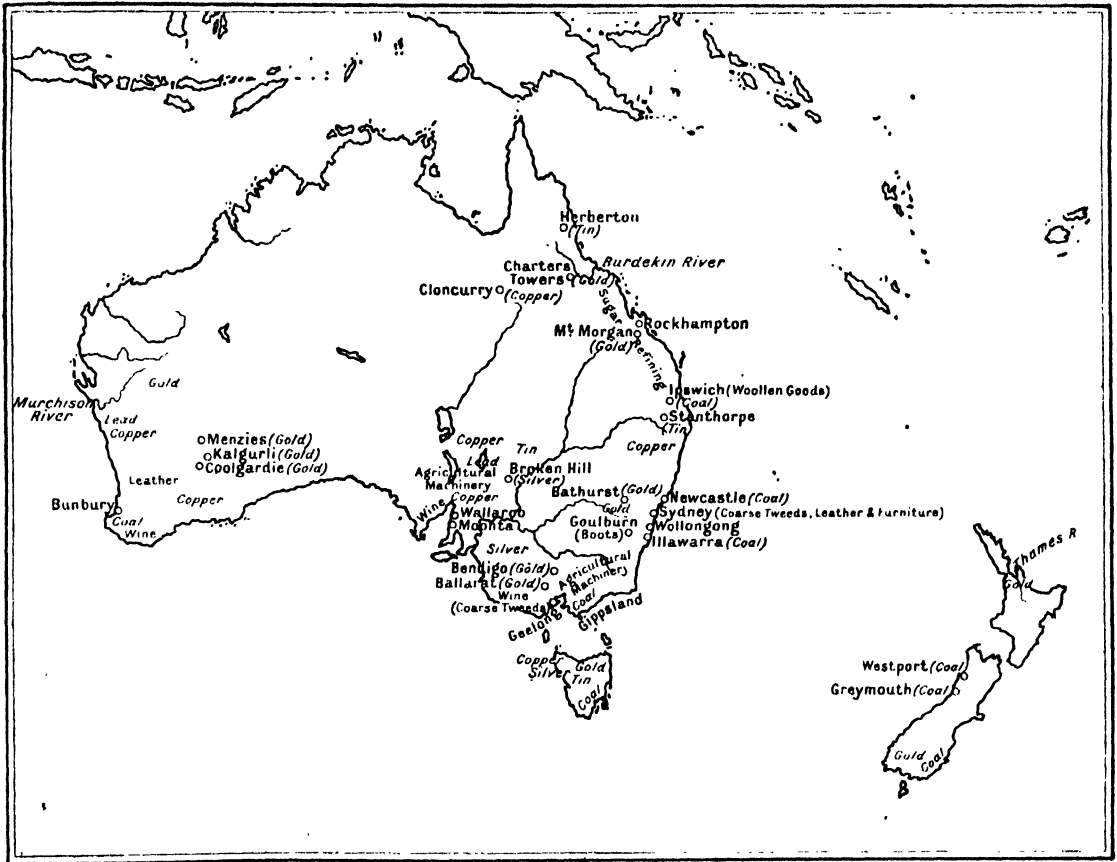
basin of North Island, in the western mountains of South Island near *Westport*, and also in the district behind the port of *Dunedin*.

Coal.—The eastern part of Australia is rich in coal, especially *New South Wales*. It is also found in *Tasmania* and *New Zealand*. *Iron* is found in all the States,

Wollongong is the port for the Illawarra district. The chief centre of the *Queensland* supplies in *Ipswich*. A poorer kind of coal is found in *Gippsland* (*Victoria*), while rich supplies are found in *Western Australia* and exported from *Bunbury*.

Tasmania and *New Zealand* have also deposits of coal. In the latter it is found in the western mountain region of South

Map 84.



AUSTRALASIA—MINERALS AND MANUFACTURES.

but except in *New South Wales* it is far removed from the coal and does not pay to work.

New South Wales has very rich seams, the two most important districts being in the *Hunter River*, and in the *Illawarra* district south of *Sydney*. From *Newcastle*, the port of the former, coal is not only exported to the neighbouring States, but is sent to *India*, *China*, and *South America*.

Island and exported from *Westport* and *Greymouth*. State owned mines are worked at *Seddonville*.

Copper.—*South Australia* has rich supplies of copper in the *Burra Burra* district, 100 miles north of *Adelaide*, and at *Moonta*, between *Spencer* and *St. Vincent* Gulfs. It is shipped from the port of *Walleroo*. *Queensland* has rich supplies south of the *Gulf of Carpentaria*.

Smaller quantities of copper are obtained from *Western Australia* and *New South Wales*.

The chief centre of the *Queensland* deposits is *Cloncurry*.

Silver.—*New South Wales* produces the most silver. *Broken Hill*, on the South Australian border, is the most important centre, and is in railway communication with *Port Pirie*.

Smaller quantities are obtainable from *Victoria*, *South Australia*, *Queensland*, *Tasmania*, and *New Zealand*.

Tin is an important product both in *Queensland* and *Tasmania*. Smaller quantities are obtained from *Victoria*, *Western Australia*, and *New Zealand*.

In *Queensland* it is found at *Stanthorpe*, on the New South Wales border, and at *Herberton*, near the east coast.

Minerals of Lesser Importance.

These include *zinc*, found in *Victoria*; *manganese*, *bismuth*, and *antimony*, in *Queensland* and *Tasmania*; *lead* in *Western Australia*, *Queensland*, and *Tasmania*; *graphite* in *New Zealand*; and *building stones* in *New South Wales* and *New Zealand*.

Manufactures.

The greater part of the population is engaged in mining, agricultural, and pastoral occupations, but the rich supplies of raw material, together with the coal and iron deposits, have caused the people to manufacture goods for home use rather than buy imported goods from the Mother Country.

Of such industries *coarse tweeds* are manufactured at *Sydney* (New South Wales), *Geelong* (Victoria), and *Ipswich* (Queensland), and exported to the other States of the Commonwealth. *Leather goods* are manufactured at *Sydney* and *Goulburn*, especially *boots* at the latter town. *Furniture* is made at *Sydney* and *agricultural machinery* at *South Australia* and *Victoria*.

In addition to these products the large growth of the vine in the southern States has caused an increasing manufacture of wine, which is exported from *Victoria*, *South*, and *Western Australia*.

Butter is now made and sent in large quantities to the Mother Country, and this exportation has been made possible by modern refrigerating machinery. Sugar is also made in the more tropical lands of the north-east.

EXERCISES.

1. Name the chief gold-producing districts of Australasia. How is the gold now obtained? State how it differs from that obtained by the earlier settlers.
2. State the chief coal and iron-producing regions of Australasia. Why is the latter mineral little worked?
3. Trace a map of Australia. Insert the chief mineral deposits, and the lines of railway communication between them and the coast.
4. What manufactures are dependent upon the vegetable and animal products of Australia? Distinguish between those manufactured for home purposes and those exported.

Routes.

Australia has been developed since the introduction of railways, therefore these were constructed before roads. The Eastern Highlands offered an almost impassable barrier, especially in south-east.

Study the accompanying Route Map, and observe the following facts: In the east there is no network of railways similar to those of Europe, but lines from the east coast cross the ridge to the mining and pastoral districts of the interior. Notice that many of these are not linked up to the other railways. These railways have been constructed, where modern engineers have been able to cross the mountains, to some source of wealth in the interior. Observe that there is no communication from the coast inland between *Sydney* and *Melbourne*. Here the mountain barrier is uncrossable (see surface of Eastern Highlands).

The capitals of *Brisbane* (Queensland), *Sydney* (New South Wales), *Melbourne* (Victoria), and *Adelaide* (South Australia) are now linked together by railways, but through communication is impossible owing to the gauge of the railways differing in each State.

From the south-west coast railways are being carried into the desert interior, where rich supplies of gold can be obtained. Trace

the following routes, noticing what physical features they cross:—

From *Townsville* to the goldfields at *Charters Towers* and across the mountains to *Winton*. It is proposed to carry this line to the copper districts of *Cloncurry*, and from there to the north coast at *Normanton*.

From *Rockhampton* inland across the Dividing Range to *Longreach* on the Thompson tributary of Cooper's Creek. *Rockhampton* is also linked to *Brisbane* by a railway following the coastal plain.

From *Brisbane* a line passes through the coal area of *Ipswich* across the mountain barrier into the Murray-Darling basin at *Charleville*. From *Toowoomba* on this line a southern branch follows the western slope of the Dividing Range, passing the tin mines at *Tamworth* and then via the Hunter River through *Maitland* to the coast at *Newcastle*. *Newcastle* is joined by a coast railway to *Sydney*. From *Sydney* trace two lines of railway, a north westerly one passing through the goldfields of *Bathurst* to the sheep-farming and copper mining districts of *Bourke*, in the basin of the Darling. The south-westerly and more important line from *Sydney* connects it with *Melbourne* through the coal districts of *Goulburn*, and the pastoral areas of *Wagga Wagga* on the western slopes of the ridge. The difference of gauge on the railways makes a change of trains necessary at *Albury* on the border.

From *Melbourne* a number of railways are carried inland to the rich agricultural lands of the interior, and also to the mining centres of *Ballarat* and *Bendigo*. The latter line is continued to *Adelaide*, the capital of South Australia.

From *Adelaide* trace a line passing through the copper districts, and then via Lake Torrens and west of Lake Eyre to *Oodnadatta*. Notice a dotted line from here to *Palmerston* on the coast of Arnhem Land. This latter is a projected railway, which will follow the course of the overland telegraph which now connects the latter place to *Adelaide*.

The line from *Adelaide* to *Oodnadatta* sends a branch to the silver districts of *Broken Hill* on the New South Wales border.

In the south-west the two ports of *Perth* and *Albany* are connected by rail, which is continued north to *Geraldton*.

From *Perth* trace the line running to the

Kalgurli, *Coolgardie*, and *Menzies* mines, and also the line from *Geraldton* to the *Murchison* goldfields.

Railways of New Zealand.

In North Island trace a main line of railway from the important port of *Auckland* in the north to *Wellington* in the south, and notice the branches radiating from it.

In South Island trace the route from *Culverdon*, through *Christchurch* and *Dunedin*, to *Invercargill*, and notice that it follows the eastern plain. From *Christchurch* and *Dunedin* branch lines are carried into the interior to bring the products to the coast.

River Navigation.

The rivers of Australia, being mostly intermittent, are of little use for navigation, the Murray only flowing throughout the year. Steamers of shallow draught navigate this river to *Albury*, a distance of 1700 miles, but the sandbar at the mouth makes it necessary to transport the goods by land for a considerable distance. Small steamers also navigate the Murrumbidgee and the Darling for some distance, except in the dry season.

EXERCISES.

1. Explain why no railway communication from the coast inland exists between *Sydney* and *Melbourne*.
2. Name the chief railway systems of *Queensland*. Explain why these are not linked to each other. What obstacles have these railways to cross, and with what object have they been pushed into the interior?
3. Name the chief railways of *Western Australia*. For what purpose have they been carried in to the interior?
4. Describe the railways of *New Zealand*, and show what use they make of natural features.
5. Why are the rivers of *Australia* of little use for navigation? Name the chief rivers which are navigable for river steamers.

Ports.

The chief ports are, in most cases, the capitals of the States, from which in early days settlers pushed into the interior.

Sydney has a beautiful as well as commodious harbour in Port Jackson. *Newcastle*, lying north of *Sydney*, at the mouth of the Hunter River, and *Wollongong*, in the Illawarra districts, are two

important coal ports in New South Wales.

Melbourne has a deepened harbour where the Yarra River enters Port Phillip, capable of accommodating the intercolonial steamers, but the output of *Port Melbourne* is the calling place for ocean-going liners. Notice the port of *Geelong* on the west of Port Phillip Bay.

Brisbane, the capital of Queensland, has accommodation for large ocean-going vessels, and *Maryborough*, *Rockhampton*, and *Townsville* are other ports in this State. *Townsville* has great importance due to its proximity to the gold-mining centre of Charters Towers. *Cairns*, in the north-east, has an important export of tin and bananas. Notice the railways from the two latter, which cross the mountains to the interior.

Port Adelaide, 7 miles from the capital, is the chief port in South Australia. On Spencer Gulf are *Walleroo*, the copper exporting port, and *Port Augusta*, which exports wheat. *Port Pirie* exports the tin of the *Broken Hill* district of New South Wales.

Albany was the most important port of Western Australia, but the deepening of the port at *Fremantle* has transferred a large amount of its trade. *Bunbury*, on Geographie Bay, is a coal port.

Hobart is an important harbour in Tasmania with a commodious harbour at the mouth of the River Derwent. *Launceston* is the second port, and has a large trade with the mainland of Australia.

In New Zealand *Auckland*, on the east side of North Island, is the most important port, although *Wellington*, the capital, on Cook Strait, has a good harbour. *Lyttleton* is the port of Christchurch and the Canterbury Plains. *Dunedin* is the outlet of the goldfields. *Invercargill*, with its outport of *Bluff Harbour*, on Foveaux Strait, is the shipping centre of the south. *Greymouth* and *Westport*, on the west of South Island export coal. *Timaru* and *Oamaru* have a large export of "Canterbury" lamb.

The only harbour of importance in New Guinea is *Port Moresby*, from which regular steamship communication is carried on with the ports of Queensland.

Commerce.

The large amount of excellent pasture land in Australia has led to the present

importance of *sheep* and *cattle rearing* and the export of *animal products*. The Commonwealth possesses nearly 100,000,000 sheep and 12,000,000 cattle, and produces annually about 800,000,000 lbs. of *wool*. *Tallow*, *frozen meat*, *hides*, and *butter* are exported in large quantities. Agriculture, with the aid of irrigation, is increasing in importance, and there is now an important output of *wheat*, *fruits*, and *wine*. The *sugar cane*, *bananas*, and *maize* are produced in the tropical parts of the north-east. The mineral wealth is very extensive, and has played a very important part in the development of the country. This is clearly shown by a comparison of the Mineral and Railway Maps of Australia. *Gold*, *copper*, *silver*, *lead*, and *tin* are exported. A large amount of valuable *timber* is found in the south-east and south-west, and is in great demand due to its toughness and durability. The imports consist mainly of *manufactured goods*.

Chief Exports.

Wool . . .	£26,400,000
Gold . . .	12,000,000
Wheat & flour . . .	9,800,000
Hides . . .	4,300,000
Butter . . .	3,500,000
Copper . . .	3,300,000
Tallow . . .	1,600,000

Chief Imports.

Metal goods . . .	£12,000,000
Textiles . . .	7,000,000
Apparel . . .	5,000,000
Machinery . . .	4,300,000

The chief exports to the United Kingdom are *wool*, *wheat*, *meat*, *butter*, *hides*, and *copper*.

New South Wales.

The area of this State under cultivation is rapidly increasing, and *wheat* forms the staple product. *Maize*, *barley*, *oranges*, and *lemons* are also grown. The pasture land is a source of great wealth, and the *wool* production is very large.

Gold production is steadily decreasing in importance, but there is a great wealth of *silver* in the Broken Hill district and of *coal* round Newcastle. The chief exports are *wheat*, *flour*, *meat*, *wool*, *butter*, *silver*, *hides*, and *tallow*.

Victoria.

The wealth of this State is now mainly in its pastoral and agricultural industries. *Wheat* and *barley* are the chief cereals grown, but great progress has been made during recent years in *fruit* culture and the manufacture of *wine*. The irrigation colony round *Mildura* is an important *fruit area*. *Sheep*

rearing supplies large exports of *mutton* and *wool*, and *cattle rearing* has led to an export of *butter*, for which Victoria is noted.

The mineral wealth is steadily decreasing, but the *gold* export is still important. The forest area of the south-east corner of the State has produced a large amount of valuable *timber*. The chief exports are *wool*, *frozen meat*, *hides*, *butter*, *gold*, and *wheat*.

Queensland.

Pastoral industries are very important, *sheep rearing* resulting in a large output of *wool*. *Cattle* are also reared, but on a much smaller scale. Agriculture, due to the more tropical conditions in this State, gives a yield of *maize*, *sugar cane*, *bananas*, *pineapples*, *oranges*, and *tobacco*. Forest areas are extensive in the north and east, and *cedar* and *piné* are obtained. Mineral wealth is abundant, *gold*, *copper*, and *tin* being extensively mined.

The chief exports are *gold*, *frozen meat*, *wool*, *tallow*, *hides*, *copper*, *tin*, *sugar*, and *fruits*.

South Australia.

Only a small portion of South Australia is at present of much commercial value, and the chief resources of the State lie in the south-eastern corner. *Wheat* and the *vine* are largely cultivated, and the manufacture of *wine* is increasing in importance. The irrigation colony round *Renmark* produces a variety of *fruits*, including *oranges*, *lemons*, *peaches*, and *currants*.

Copper is the chief mineral, and there are several famous copper mines. The chief exports are *wheat*, *copper*, *wool*, and *wine*.

Western Australia.

Agriculture is rapidly extending in this State, and *wheat* now forms a very important crop. Large quantities are exported. *Oats* and *barley* are also grown, and the *vine* cultivation is extending. The forest area of the south-west corner is a great source of wealth, *jarrah* and *karri* being valuable exports. The mineral wealth is important, the output of *gold* being considerable. *Copper* is also extensively mined, and the *pearl* fisheries off the north-west coast are famous.

The chief exports are *wool*, *gold*, *timber*, *hides*, and *wheat*.

Tasmania.

Agriculture is the chief industry of this island, *wheat* and *fruits* forming the main crops. Pastoral industries employ a considerable number of people, and lead to the export of *wool* and *hides*. A variety of minerals are mined, the chief being *gold*, *silver*, and *tin*. The exports are *wool*, *fruits*, *gold*, *silver*, *tin*, and *hides*.

British New Guinea.

The chief agricultural products are *cocoanuts*, *rubber*, *sisal*, *vanilla*, *tapioca*, and *cinnamon*. *Palm produce* and *ebony* are obtained from the forest area. The exports are *copra*, *trepang*, *gold*, and *rubber*, while the imports are mainly *foodstuffs* and *apparel*. *Port Moresby* is the chief commercial centre.

New Zealand.

The chief wealth of this colony is at present in the valuable pasture land. *Sheep rearing* is the great industry on the grass lands, and it produces large exports of *wool*, *frozen meat*, *tallow*, and *hides*. *Cattle rearing* is relatively unimportant, but there is nevertheless a fairly large production of *butter* and *cheese*. Agriculture is progressing rapidly, and there has been a marked increase in the *wheat* production in the last few years. The country possesses important forests, and sawmills are numerous. *Kauri pine* is a valuable timber. *Gold*, *silver*, and *coal* are mined, but *gold* is the chief mineral exported.

Chief Exports.

Wool	£7,100,000
Meat	4,000,000
Butter & cheese	3,800,000
Gold	1,400,000
Hides	1,100,000
Tallow	700,000

Chief Imports.

Clothing	£4,400,000
Machinery & iron goods	4,300,000
Paper	900,000
Sugar	800,000

The chief exports to the United Kingdom are *wool*, *mutton*, *butter*, *tallow*, *beef*, and *sheep skins*.

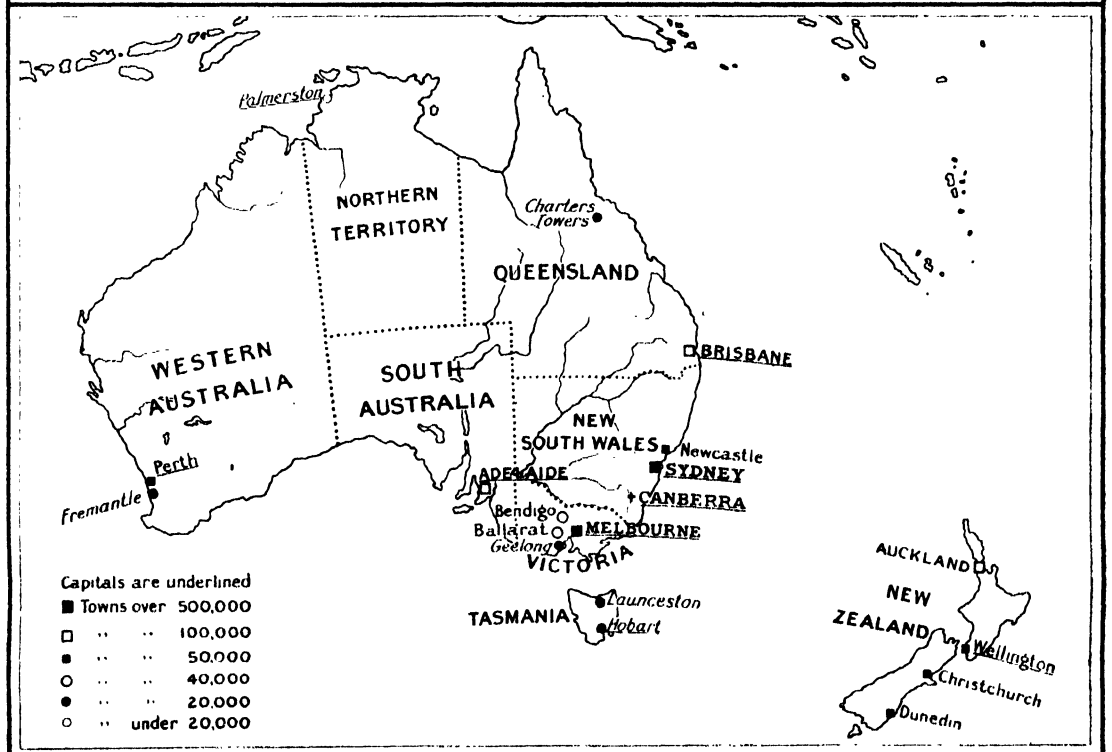
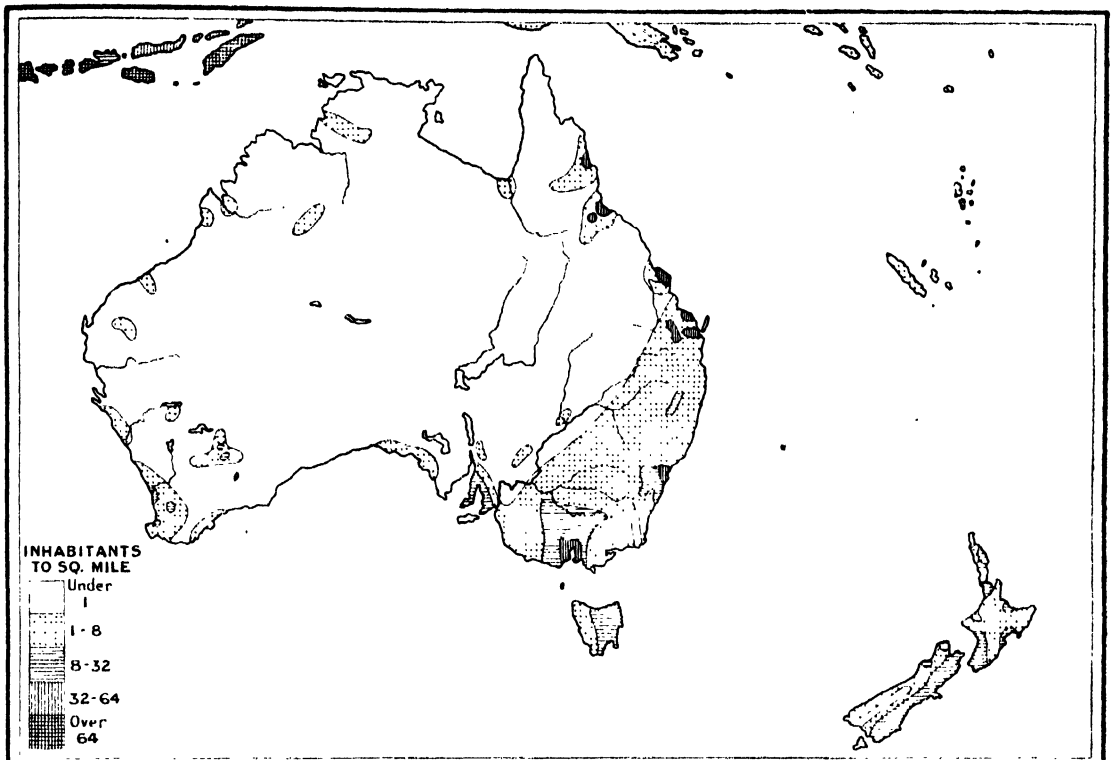
EXERCISES.

1. Plot a curve to show the value of the British import of wool from Australia from the following data—

1906	£11,600,000	1910	£14,200,000
1907	14,500,000	1911	14,600,000
1908	13,400,000	1912	12,600,000
1909	13,700,000		

2. Make a similar curve for the wheat import—

1906	£2,800,000	1910	£5,700,000
1907	3,200,000	1911	5,700,000
1908	2,400,000	1912	5,400,000
1909	4,700,000		



3. Classify the Australian ports with regard to their export trade in mineral, vegetable, and animal products.
4. Write an account of the value of animal products to the commerce of New Zealand.
5. From which special parts of Australasia do we import wool, frozen meat, butter, apples, and wine respectively?
6. Say what you can of the commercial importance of kauri gum, jarrah, and New Zealand flax.
7. Give an account of the commerce of the Tasmanian ports.

Population.

Compare the Population Map with the preceding maps of Australasia, and notice how the natural conditions of surface and climate and the distribution of vegetable and mineral wealth have determined the distribution of the people. A comparison between the Mineral and Population Maps shows that the mineral-producing regions have a relatively denser population than the surrounding lands. Another comparison between the Population and the Vegetation Maps shows that the more fertile parts of the Eastern Coastal Plain and the regions in the south capable of growing Mediterranean products have a larger population than the pasture areas, while the poorer scrub land and desert of the interior are practically uninhabited. The contrast between the forested mountain lands of the west and the rich agricultural and pastoral plains of the east is clearly shown in the distribution of population both in Tasmania and South Island (New Zealand).

The 1911 census shows that *Victoria* has the densest population, with nearly 15 people to the square mile. *New Zealand* has 10, *Tasmania* 7, *New South Wales* 5.3, *South Australia* a little over 1, and *Queensland* rather below 1 person to the square mile, while in *Western Australia* there are 3½ square miles to each inhabitant, and in the *Northern Territory* 175 square miles for each person. It must be remembered that *New South Wales*, *Queensland*, and *South Australia* contain large areas of thinly peopled pasture lands, and that a great part of

Western Australia and the *Northern Territory* consists of desert, poor scrub, and pasture.

New Zealand has dense populations in the districts around *New Plymouth* and *Egmont* on the west coast, *Hawkes Bay* in the east, *Auckland* in the north, and *Wellington* in the south of North Island, and around *Canterbury* in South Island.

REVISION EXERCISES.

1. From which countries are the following commodities principally exported: wheat, wine, tea, coffee, cocoa?
2. Where are the following products to be found, and to what uses are they put: caoutchouc, cocoanut, indigo, petroleum, mercury?
3. Name the districts in Europe which produce oranges, tobacco, quicksilver, and coal.
4. From what parts of the British Empire are the following exported: coffee, diamonds, gold, mahogany, palm oil, tea, and wool?
5. What are cork, deal, and petroleum? From what parts of the world do they come?
6. Name some of the valuable vegetable products which grow only in the tropics.
7. From what ports are rice, tea, cigars, gold, currants, teak, and mohair shipped to Britain?
8. From which countries does Britain import wheat?
9. Whence does the United Kingdom import its supplies of sugar, copper, tin, and wool? Mention in each case the port of shipment and the port of unloading.
10. What are the chief commodities of the Baltic trade?
11. Which South American States produce: (1) quinine, (2) cocoa, (3) diamonds, (4) guano, (5) nitrate of soda?
12. From which countries do we obtain our chief supplies of tea and coffee?
13. Name the valuable medicines obtained from the forests of the world.
14. State the chief wheat-growing regions of Europe. Account for their importance.
15. Give the use of each of the following: kauri gum, cinchona, eucalyptus, Chile saltpetre, abaca, manioc.
16. State the geographical conditions necessary for the production of rice and cotton.
17. What are the uses of the following: amber, jute, flax, and hemp?

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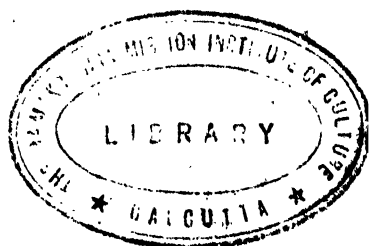
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